

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Stuart B. Levy et al.

Serial No.: N/A

Filed: Herewith

For: NIMR COMPOSITIONS AND THEIR
METHODS OF USE

Attorney Docket No.: PKZ-043

jc713 U.S. PRO
09/801563
03/08/01

Box Sequence
Commissioner for Patents
Washington, D.C. 20231

TRANSMITTAL LETTER FOR DISKETTE CONTAINING SEQUENCE
LISTING

Dear Sir:

Enclosed is a diskette which contains a computer readable form of the Sequence Listing for the patent application filed herewith. The Sequence Listing complies with the requirements of 37 C.F.R. § 1.821. The information recorded in computer readable form is identical to the written Sequence Listing appearing on pages 1-423 submitted herewith, as required by 37 C.F.R. § 1.821(f). The computer readable form of the Sequence Listing contained on the enclosed diskette is understood to comply with the requirements of § 1.824(d).

"Express Mail" mailing label number EL489806595US

Date of Deposit March 8, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents, Box Patent Application, Washington, D.C. 20231

Viriato G. Cardoso
Signature

Viriato G. Cardoso

Please Print Name of Person Signing

Respectfully submitted,

LAHIVE & COCKFIELD, LLP

By Megan H. Williams
Megan H. Williams, Ph.D.
Reg. No. 43,270

SEQUENCE LISTING

<110> Levy, Stuart, et. al.

<120> NIMR COMPOSITIONS AND THEIR METHODS OF USE

<130> PKZ-043

<140>

<141>

<150> 60/188,362

<151> 2000-03-10

<160> 98

<170> PatentIn Ver. 2.0

<210> 1

<211> 14000

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (9174)..(9644)

<400> 1

```
cactccttgt ctgctaaaaa tgtgactcaa aaaccctttg ccggatggcg gccagcatc 60
tgtttacatc attacgacgt caaactgctc ctggttatag agcggttcaa tttgtacttt 120
aacctgtttg ccaacgaaaa tttccacttc cgccagcgag tgtgactcct cgcctttcaa 180
ggcttcagct actgccggag aagcatagac caggaaacgg tcggagtcgt aagcatggtg 240
gacacgaaca atctcgcgca tgatttcata gcataccgtt tccacggttt tcaccgttcc 300
gcgaccgtgg caggttgggc attcgttaca cagtacgtgc tcaatgcttt cgcgggtgcg 360
tttacgcgtc atctccacca gcccagcgc cgaaaaacca ttaacgctgg ttttcaccgg 420
gtctttgctc aacgcctgct ccagcgagtg cagcactcgg cggcggtgat cttcattatt 480
catatcgatg aaatcaataa tgataatccc gccagatta cgcaaccgta actggcgagc 540
gatagcctgc gtcgcttcaa tattggtatt gaaaatgggt tcgtccagat tgcgatgacc 600
gacaaacgct ccggtattga tgtccacggt ggatcatcgt tcggtctggt cgataatgag 660
ataaccaccg gatttcagtt ctactttgcg ttccagcgct cgctggattt cgttttcgac 720
atcaaagaga tcgaaaatcg gctggcgtcc tgtgtaatgc tccagcttgc ttgtcatctc 780
gggaatgtac tccgaggtga actcaagtaa cgcttcgtaa gtcaggcgtg agtcaacgcg 840
aatgcggtcc agttcggcat cggcgaaatc acgcagaaca cgctgcgcga gcgccagttc 900
```

gccgtacagc	tgataacggg	tctgcggg	gctttttacgc	tccataactt	tggtccagac	960
gcgtttcaga	taagcggcat	cggaggccag	ttcagcctcg	ccaacccctt	ccgctgcggt	1020
acggatgata	aacccgcct	gctcgtcgca	atactctgcg	accacttttt	tcaggcgcttc	1080
acgttctgat	tgcgtttcaa	tacgttgga	aacccaacg	tgagaagccc	ctggcataaa	1140
caccagatag	cgagaagga	gcgtgatatc	ggtggtcagg	cgcgcacctt	tagtgccaag	1200
cggatctttc	accacctgca	ccatcagatc	ttgcccctga	cgaaccagtt	ccgagatgtc	1260
gcgcacogtg	aattgctttt	gttcttcacc	cgccacacat	tcggtgtgcg	gcatgatgtc	1320
ggatgcatga	agaaacgcg	ctttatccag	ccaatatct	acaaaagccg	cctgcatacc	1380
cggaagtaca	cgacttacac	gacccttgta	gatattgcct	actattccgc	gtcgcgcctc	1440
acgttcaata	tgaatttct	gcagaatacc	gccatcaata	tacgccactc	gcgtttccga	1500
aggcgttacg	tttactaaca	attcagcgt	catgtttatc	ccttttctca	cgcagtgcgt	1560
taaaattact	taataattca	tacgtttcaa	ccagcggtaa	gcgcactacg	gcgtgatagc	1620
tgccatttat	cttcctgaca	aaacagccac	ccagcccctg	aataccgtat	gcacctgctt	1680
tatctaacgg	ttcatcgctg	gcgacatagc	ccgcgatgtc	ttcgtctgtt	aacgtttctga	1740
aagtcacatc	ggtgaccacc	aggcaatoga	gaatgtgctg	gctgtcggcc	aacgccactg	1800
ctgtcatcac	ctgatgggtc	tgacccgata	atttgcgcaa	catctgcgcc	gcatgctctg	1860
cgtcgcgcgg	tttctccagc	acttctcgt	tcaggataac	gatagtatcc	gcaccagca	1920
ccgggagatc	cttcgcggtt	tgcgcgacac	ctgcccgctg	tttctcgcgc	gccagacgca	1980
caacatactg	ctgcgcgcctc	tcctgcggct	gacgctgctc	ctcaatgccc	gtaacaatac	2040
gttcaaaggt	cacgccaagt	tgcgcaagta	actcctgacg	acgcggagaa	ccggaagcta	2100
aatacagaga	agtcatagaa	acctttattg	actgcaaac	tgctgacgga	ctttgcgcat	2160
cagcaagaaa	atccacggcc	agagcacccc	attgactaca	ctactccaga	acacttccgg	2220
tctgaaagag	acgttaatca	ctaaaaactc	tgcccagaaa	acaataatat	ccaccaccag	2280
cgaaagcaac	atgacgacca	gcgcctgctg	ccataatgcg	aggttgcgga	aaagctggta	2340
tttcagcgcc	accaggtaa	caatgatgct	catcgccaat	acgcgtacgc	caagcgtcga	2400
gccgctgatc	agatccagta	tggcacccat	cacaaaacct	gtgccacat	ttacgcgatg	2460
aggcaaggcc	aggatccaat	acaacaagat	gagtaacacc	cagtttggcc	ggaaaacaat	2520
caggttatcc	ggccagggca	tqattttqca	caacaqcga	atgaqgaaa	agagccagat	2580

tacccagcgt	ccttggtac	gatagetcgc	cactattgcc	ctcccggcgc	acgcgcaggc	2640
ggttgagcac	cactttgcgg	cggcgtagcc	ctttgtggag	agcgattagc	agcaggctgt	2700
gtcggcgag	caggcgagc	agctgcattt	cctgtgcgcg	gttgctgcgg	agtcggctga	2760
gcgatccccg	ttgccggttc	aggtaacttt	ggcccatcg	cgtctggcga	aggcaatacc	2820
tgccgcatca	tctgcatcag	acgttcatta	gcaacacgat	gcacctcttc	cggcgtcac	2880
gggttagcgc	cgttacgac	tgccccccac	agcagcagca	gataacgcaa	acgttgacgc	2940
cctgcagtcg	gacgcgcctg	aatcacagta	taagcgcgct	gggtatcgag	ttttacggaa	3000
gagacaaccg	cgaccggata	gccttccggg	aaacgaccgc	ccagaccgga	agtcaccagc	3060
acatcaccaa	cacgaatatc	cgtattcgcc	ggcagatgct	caagctgcaa	atcatccgta	3120
caaccgttac	cggctgcaat	tacgcggata	tcgttgcgca	gcacctggat	tggcagcgcg	3180
tgggtcgcac	cacaaatcag	cagcacgcga	ctggtcagtt	tagcgacggc	caccacctga	3240
ccaacaacac	ctttgtcgct	gatgaccggc	tggccttcac	aaacgccatt	aacgctacct	3300
ttatcgataa	caacttgatc	gctataagga	tcgttaaccg	tggagataac	ctgagtcacc	3360
attttctgct	cactctgacg	cagcggggaa	cccagcagct	cgcgcagacg	cgcgttctcc	3420
tgtttgtatt	gtccaagcat	cagcagttca	ctgtttttca	gcaacagttc	ctgacgtaac	3480
gcccggtttt	caagttctaa	ttggtcacgc	gaggccagcg	tctgcgatac	gccatccagc	3540
aattcacgag	gagcattgga	aacaaagtag	aaaggactga	cggcggtatc	catataagta	3600
cggatttgac	tgaacgtccc	caggcggctg	tcggcaataa	taatgccgag	cgccaccagc	3660
accgccagaa	taaggcgaat	ctgtagcgac	gggccacggc	taaaaattgg	cttcataagt	3720
tatgcgtatt	ctcgtatcag	accaggcagg	gtaaacagac	acttcccttg	cctgcatccg	3780
attactcttc	gctgaacagg	tcgccgcgct	gcattgtcgat	catttccagc	gctttgccgc	3840
caccgcgcgc	cacacaggtc	agcgggtctt	cagcaacaac	gactggaatg	ccggtttctt	3900
ccattaacaa	acgggtcaagg	ttacgcagca	gtgcgccacc	accggtgagc	accatgccgc	3960
gctcggagat	gtcgggaagc	agttccggcg	ggcactgttc	cagtgcgaac	attaccgcgc	4020
tcacaatacc	ggtcagcggg	tcctgcagtg	cttcgaggat	ttcattggag	ttcagggtaa	4080
aaccgcgtgg	aacaccttct	gccaggttac	ggccacgaac	ttcgatttca	cggacttcat	4140
cgcccgata	agccgaaccg	atttcgtgct	tgatacgttc	tcgggtggct	tcaccgatca	4200
gagaaccgta	attacgacgc	acatagttga	tgatagcttc	gtcgaaacgg	tcaccaccaa	4260
tgcgcacaga	agaggagtaa	accacacgct	tcaaggagat	aacagcaact	tcagtggtag	4320

caccaccgat atcaaccacc atagaaccgg tcgcttcaga aaccggcagg ccagcaccaa 4380
ttgcggcagc catcggttct tcaatcagga agacttcacg ggcaccagcg ccctgcgcgg 4440
attcacgaat tgcgcggcgt tcaacctggg tcgcgccaac cggcacacaa accagaacgc 4500
gcgggcttgg acgcataaag ctgttgctgt gcacttgttt gatgaagtgc tggagcattt 4560
tttcagtcac gaagaagtcg gcgataacgc cgtctttcat tgggcgaatg gcagcaatat 4620
tgcccggcgt acggcccagc atctgcttcg cgtcatgacc tactgcagct acgcttttcg 4680
gtgaaccggc acgatcctga cgaatggcca ccacggaagg ctcatccaat acgatgcctt 4740
gtccttttac ataaatgagg gtattcgag taccagggtc aatggacaag tcattggaaa 4800
acatgccacg aaattttttc aacatactaa gggataatcc tgaaagctgg ggcggaaaag 4860
aaaatccgct tactttacca accacacgca gcagcgacaa ggcgcaaaaa tcatctgcta 4920
cggtgaaaat tagtgcagtt cgtttccttt gttacaaatc tctgcctgag tccagaaagg 4980
cttaatgcat cagcagcatt cctcgctgt ttgcaaccgc gtaaggatcat tcatctgcat 5040
atgtgctgca acaatctggc gagcagacaa gcacactccc atgagacgca gcgcgcatta 5100
ttctacgtga aaacggatta aacggcagg taaaccgagt atctttgtga atattttttc 5160
acgttagtat caagtggctg tgaggacgcg aaaaaatccc cttgcccgcg tgtaacaccg 5220
cgctgaatca gggctctgcca ctcgcttcgc gaacgcacgc cgggtggcgta aacctgggtg 5280
ctgggtcccgg agcaggcttc caccaggctt tgaaccagca gctgggttctc cgttcgcttc 5340
tcaatgtttc tgaccagccc cggatggagc ttgagtaact caacattaag ttctttgatc 5400
caactggtac ttaccagcgt caaaccagcc tggttgacgg ctaccogtac ccctaaagca 5460
ttcactaaac gaataacagg ttgtaaacga ctgatatgtt gacctacatc ggcctctgca 5520
agttcaataa ttatgcgttt tcgttgatg ttttcacatt gcattaacgt atcgcgcagc 5580
caacgctgaa aacgcgggcg aatcagcgac tcaacggtaa cctgaatcgc cagattttcc 5640
tctggccagt aacgcaatag tggaataaga cggctgattt gcagacggtc atactcttcc 5700
gataagccaa actgcaagac catcggcata tactccgcgc agctaacctc ttcattacca 5760
tcgaagatgc ggcacatgag ttcgcgatga tgaacctgac cttcgcgagt aaccgcccgt 5820
ttttgataaa ggcgcggggc gccgcgactg agcatttgct cgataagcgt acgccagcga 5880
acattaccgc gtcctttttc aggcaacgag tcatcgtaaa tagcccagct attgccgccc 5940
tgcaatcccg cattacgcgt ggcagactct gcatgttcca ttacctgctc ggtatcctga 6000

gtcggttgcg tttccggtcg cgaaagtacc catgaatata tgaaaagttt aggtgctagc 7800
 cgtgtttctcc ctcgatgatga gtttgccgaa tcccgtcctc tggaataaca agtctgggct 7860
 ggggcaattg acaccgttgg cgacaaagtg ctggcaaaag tgctggcgca aatgaattac 7920
 ggcggctgcg tggcggcctg tggctctggcg ggtggtttta ctctgccaac cacggtcatt 7980
 ccatttatcc tgcgtaattg ccgtttgcaa ggggtggatt cagtaattgac gccaccagaa 8040
 cgccgcgcac aagcctggca gcgactggtc gcgatttac cggaatcatt ctataccag 8100
 gcggcaaaag agatatctct gtcagaggca ccgaactttg ccgaggccat cattaataac 8160
 cagatccagg gtcgcacgct ggtgaagggt aactaaccat ttagcaggga ataataagag 8220
 agggaaactca ttttgaaatc attattcaat cggttaacgg gaaaagcggg tagccggaca 8280
 gctttctgctg aacaccttgg tcaggaaggt atacaacatc atccaaactg gaaagtcatt 8340
 atttcgactg accacaaatt gatgcgcatt gatactccac taaacagcta ttattgatac 8400
 gcctccgtcg cctgttaggt ttatgttgcg ttgcctgggc gacgctacgc ttagccctt 8460
 acttatttct ggtaccatgg ggtgaataat ctgattttgt ttgactacaa attaatcact 8520
 cgaacctatt taatgctgag cattgtcaat cggttaattt tgcgtgcttt agcattcaca 8580
 tctatccaga cgatgcagtg aaaattgggt aatccccagc aaccgctgcg taatgtcgct 8640
 tatcttctg cgatcctggc atccctacat tatttgtggt ctgtgaagat tatctcattg 8700
 cagccctca tcttcgcagg gctggctttt cagcttttca ccttacgtta taagaagttc 8760
 cgtcgatgat ggcgctaatt tcgtgaattg tgcggcttgt tgcaaattac acgggtgttg 8820
 aggttattta catgttagct gttgattatc ttccctgata agaccagtat ttagctgcca 8880
 attgctacga aatcgttata atgtgcgacc tcgtcctccc tgacgcagtt tttgcgctgc 8940
 ggaaaagggtg acattggcgc aacgaaggta tattttgttt tttgccggag gatagcagca 9000
 gatcgtgca caatgtccgt caagtctaac attgacactc tggggcaaaa tagaccggcg 9060
 tcccggcctg ctggaattta tcgctatgca tacagctgct ggggcatacg ctttacagac 9120
 ggcggtgaaa cgcctgtcac aatcacacta aacaaagagt acggaaccca ctc atg 9176
 Met
 1
 gat att cgt aag att aaa aaa ctg atc gag ctg gtt gaa gaa tca ggc 9224
 Asp Ile Arg Lys Ile Lys Lys Leu Ile Glu Leu Val Glu Glu Ser Gly
 5 10 15
 atc tcc gaa ctg gaa att tct gaa ggc gaa gag tca gta cgc att agc 9272
 Ile Ser Glu Leu Glu Ile Ser Glu Gly Glu Glu Ser Val Arg Ile Ser

20				25				30								
cgt gca gct cct gcc gca agt ttc cct gtg atg caa caa gct tac gct	9320															
Arg Ala Ala Pro Ala Ala Ser Phe Pro Val Met Gln Gln Ala Tyr Ala																
35				40				45								
gca cca atg atg cag cag cca gct caa tct aac gca gcc gct ccg gcg	9368															
Ala Pro Met Met Gln Gln Pro Ala Gln Ser Asn Ala Ala Ala Pro Ala																
50				55				60				65				
acc gtt cct tcc atg gaa gcg cca gca gca gcg gaa atc agt ggt cac	9416															
Thr Val Pro Ser Met Glu Ala Pro Ala Ala Ala Glu Ile Ser Gly His																
70				75				80								
atc gta cgt tcc ccg atg gtt ggt act ttc tac cgc acc cca agc ccg	9464															
Ile Val Arg Ser Pro Met Val Gly Thr Phe Tyr Arg Thr Pro Ser Pro																
85				90				95								
gac gca aaa gcg ttc atc gaa gtg ggt cag aaa gtc aac gtg ggc gat	9512															
Asp Ala Lys Ala Phe Ile Glu Val Gly Gln Lys Val Asn Val Gly Asp																
100				105				110								
acc ctg tgc atc gtt gaa gcc atg aaa atg atg aac cag atc gaa gcg	9560															
Thr Leu Cys Ile Val Glu Ala Met Lys Met Met Asn Gln Ile Glu Ala																
115				120				125								
gac aaa tcc ggt acc gtg aaa gca att ctg gtc gaa agt gga caa ccg	9608															
Asp Lys Ser Gly Thr Val Lys Ala Ile Leu Val Glu Ser Gly Gln Pro																
130				135				140				145				
gta gaa ttt gac gag ccg ctg gtc gtc atc gag taa cgaggcgaac	9654															
Val Glu Phe Asp Glu Pro Leu Val Val Ile Glu																
150				155												
atgctggata aaattgttat tgccaaccgc ggcgagattg cattgcgtat tcttcgtgcc 9714																
tgtaaagaac tgggcatcaa gactgtcgct gtgcactcca gcgcggatcg cgatctaaaa 9774																
cacgtattac tggcagatga aacgggtctgt attggccctg ctccgtcagt aaaaagttat 9834																
ctgaacatcc cggcaatcat cagcgccgct gaaatcaccg gcgcagtagc aatccatccg 9894																
ggttacggct tctctccga gaacgccaac tttgccgagc aggttgaacg ctccggcttt 9954																
atcttcattg gcccgaaagc agaaaccatt cgctgatgg gcgacaaagt atccgcaatc 10014																
gcggcgatga aaaaagcggg cgtecccttg gtaccgggtt ctgacggccc gctgggcgac 10074																
gatatggata aaaaccgtgc cattgctaaa cgcattgggt atccggtgat tatcaaagcc 10134																
tccggcggcg gcggcggtcg cggtatgcgc gtagtgcgcg gcgacgctga actggcacia 10194																
tccatctcca tgaccctgac ggaagcgaaa gctgctttca gcaacgatat ggtttacatg 10254																
gagaaaatac tggaaaatcc togccacgtc gagattcagg tactggctga cggtcagggc 10314																
aacgctatct atctggcgga acgtgactgc tccatgcaac gccgccacca gaaagtggtc 10374																

ctttatgacg tegtctctggg tactgggtgtg ttttggcgtg attggcctgc cgcatactgc 12114
 ggtgcgcgtgt atctcttata aagacacgaa agccgtacat cgggggatca tcatcggtac 12174
 gattgtggtc gcaattctga tgttcggtat gcacctggcc ggagcgttag gtcgggcggt 12234
 gatccccgat ctccaccgtac cggacctggg gatcccaacg ttaatggtaa aagtgtgcc 12294
 accgtttgct gccgggatct tcctggctgc accgatggct gcgatcatgt cgacaattaa 12354
 cgcccaactg ctgcaaagtt ccgtacgat cattaagat ctctatctga atatccgtcc 12414
 ggatcaaagc caaaacgaga cgcgtctgaa gcggatgtcg gcggtaatta cgtagttct 12474
 cggcgcgttg ctgctgcttg ccgcctggaa gccgccagaa atgatcatct ggctgaattt 12534
 gttggccttc ggtgggctgg aagccgtttt cctgtggccg ctggtgctgg gtctttactg 12594
 ggaacgcgcc aacgccaaag gcgcgctaag tgcgatgac gttggcggcg tgctgtatgc 12654
 cgtactcgcg acgtgaata ttcagtacct gggcttcac cctatcgtgc cctcgttact 12714
 actaagtttg ctggctttcc tggcggaaa ccgtttcgtt acatccgtcc cgcaagctac 12774
 cgttttgact actgataaat aaagagtttt gccatgcctt ggatccaact gaaactgaac 12834
 accaccggcg cgaacgcgga agatcttagc gatgcgctga tggaagcggg tgccgtttct 12894
 atcacttttc aggataacca cgatacgcca gtatttgaac cgctgcgggg cgaaaacggc 12954
 ctgtggggcg acaccgatgt gattggtctg ttcgacgctg aaaccgatat gaacgacgtg 13014
 gtggcgattc tggaaaacca tccgctgctc ggcgaggtt tcgcgcataa aatcgaacaa 13074
 ctagaagata aagactggga gcgcgaatgg atggataatt tccaccgat gcgctttggt 13134
 gaacgactgt ggatctgccc tagctggcgt gatgtgccg acgaaaacgc cgtcaacgtg 13194
 atgttagatc cagggtggc gtttggtagc ggtaccatc caaccacctc tctgtgctg 13254
 caatggctcg acagcctcga tttaaccggt aaaacagtca tcgactttgg ctgtggttcc 13314
 ggcattctgg cgatcgcgcc gctgaaactg ggtgcagcaa aagccattgg tattgatata 13374
 gatccgcagg cgattcaggc cagcccgcat aacgccgaac gtaatggcgt ttctgaccgt 13434
 ctggaactct acttaccgaa agatcagcca gaagaaatga aagccgacgt ggtggctgct 13494
 aacatccttg caggccatt acgtgaactg gcaccgttaa tcagcgtcct gccggtttca 13554
 ggcggtttgc tgggcctttc cgttattctg gcaagccagg cagagagcgt ttgtgaagct 13614
 tatgccgata gcttcgcact ggaccggctc gtggaaaaag aagagtgggt ccgtattacc 13674
 ggtcgtaaga attaaccttc gcatcgccgt agggtgacgc ggggcgaagt gcgagcaagc 13734
 tcacaaaagg cacgtaaatt tgccgattat ttacgcaaatt ttgcgtgccaa aaattttcat 13794

tcataaagaa aaattgagaa cttactcaaa tttctttgag tgtaaatttt agtcactatt 13854
 ttctaatatg atgattttta tgagtaatta tcgcaccacg ctcattttta atgcaattct 13914
 ttgatccatc tcagaggatt ggtcaaagtt tggcctttca tctcgtgcaa aaaatgcgta 13974
 atatacgccg ccttgcagtc acagta 14000

<210> 2

<211> 156

<212> PRT

<213> Escherichia coli

<400> 2

Met Asp Ile Arg Lys Ile Lys Lys Leu Ile Glu Leu Val Glu Glu Ser
 1 5 10 15

Gly Ile Ser Glu Leu Glu Ile Ser Glu Gly Glu Glu Ser Val Arg Ile
 20 25 30

Ser Arg Ala Ala Pro Ala Ala Ser Phe Pro Val Met Gln Gln Ala Tyr
 35 40 45

Ala Ala Pro Met Met Gln Gln Pro Ala Gln Ser Asn Ala Ala Ala Pro
 50 55 60

Ala Thr Val Pro Ser Met Glu Ala Pro Ala Ala Ala Glu Ile Ser Gly
 65 70 75 80

His Ile Val Arg Ser Pro Met Val Gly Thr Phe Tyr Arg Thr Pro Ser
 85 90 95

Pro Asp Ala Lys Ala Phe Ile Glu Val Gly Gln Lys Val Asn Val Gly
 100 105 110

Asp Thr Leu Cys Ile Val Glu Ala Met Lys Met Met Asn Gln Ile Glu
 115 120 125

Ala Asp Lys Ser Gly Thr Val Lys Ala Ile Leu Val Glu Ser Gly Gln
 130 135 140

Pro Val Glu Phe Asp Glu Pro Leu Val Val Ile Glu
 145 150 155

<210> 3

<211> 10157

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (5397)..(8060)

<220>

<221> CDS

<222> (8075)..(9967)

<400> 3

aaacgggaaa gcagattccg aggtttttta ttctgttgca gcgaaagaca agaaatttgc 60
 gaggcgttac gaagaaagt gggaaggagg agattatccg cccgcgatgg agcggataaa 120
 tctgtcaact attagcgaac acgcattgaa aggtcgagtgt cttgtacgtg tttagtttagc 180
 gcaccgacgg agataaagtc cacgcccgtt tcggcaaatt cacgcagtgt tttgtcagtgt 240
 acgttgccag acacttccag tagcgccttg ccgttggtgc gtttgacggc ttccgcgcac 300
 tgttctgttt cgaagttatc cagcatgatg atatcggtct ctgctttcag ggcttcatca 360
 agttcttcca gattctctac ttcgacttct actggcgcac ccgggtgcag ccaggacgct 420
 ttttcgaccg cctggcgcac tgagccggag gcaataatat ggttttcttt gatcaggaag 480
 gcatcagaaa gcccagacg gtgattcgtt ccgccgcgc aaagtaaccg gtatttcaga 540
 gctgaacgca ggccgggtaa ggttttgcgc gtatccaaca actgcgtgtt ggtgccttcc 600
 agcaattcga catagtggcg taccttactg gcaactcctg aaagggtttg caaaaatta 660
 agcgcagtgc gttcgcccgt taacagcacg cgggatgggc cttcaagttc gaacaaggat 720
 tgattggcat tgatgacatc gccgtcatcc acatgccaga ttatggtgac atcgtcgctt 780
 gccagttgaa taaacacctc ttcaaccag cgtttgccgc aaaagacgcc attctcgcg 840
 gtgatcaccg tggcatgaga gcgagaattt tccggtaaaa gttttgccgt aatatcattg 900
 ttggcatcga ctgttccgcc taaatcttcc cgcagcgcct gggccaccgc gccggggata 960
 tcgagattaa tgcgttccag cagctcgtca cgtcgggtgt cagggttata gcggcgaggc 1020
 ggcatgttaa aactccagat agctaacgaa tcataaggta gaaacatgct actctgaacc 1080
 gggatttagc accacatata aggagatcct gcatgttgtt agaacagggg tggctggttg 1140
 gcgcgcgcgc cgttccctca ccacattacg attgccgcc ggatgacgaa acacccaccc 1200
 tgctggtggt gcacaatatt agcctgccgc caggcgagtt tggcgtccg tggatcgacg 1260
 cattattcac tggaaactatt gatccgcagg cacatcctt ctttgtgag atcgccatt 1320
 tgcgcgtctc cgtcactgt ttgattcgcc gtgatggtga aatagtccag tatgttcctt 1380
 tcgataaacg tgcattggcat gcgggagtct ctcatatca ggggcgcgaa cgtgcaatg 1440
 atttttctat tgggattgag cttgaaggca ccgatacgct ggcgtatacc gatgcgcagt 1500
 atcaacagct tgcggcgggt acgcgggcac tgattgattg ctatccggat atcgctaaaa 1560
 acatgacggg ccatttgtat attgcgcgcg atcgaaaaac cgatcccggt cctgcatttg 1620

attgggcacg	gtttcgtgtg	ctggtcagca	aggagacaac	atgacgctat	ttacaacctt	1680
actggtgtta	attttcgagc	gcctgtttaa	gttgggcgag	cactggcagc	ttgatcatcg	1740
tottgaagcg	ttctttcggc	gggtgaaaca	tttttctctc	gggcgcacgt	taggcatgac	1800
cattattgcg	atgggcgtga	cttttttact	gttacgcgca	ttgcagggag	tattgttcaa	1860
cgttcccacg	ctactggtgt	ggctgctgat	tggtttgctg	tgtattggcg	caggtaaagt	1920
tcgtcttcat	tatcatgctt	atctgacagc	tgcttcacgt	aatgatagcc	atgcccgtag	1980
cacgatggct	ggcgaactca	ccatgattca	cggcgtcccg	gcaggctgcg	acgaacgtga	2040
gtatttgctg	gagctgcaaa	atgcattgct	gtggattaac	tttcgttttt	atcttgaccc	2100
gctgttctgg	ctgattgtgg	ggggaacctg	gggaccggtt	acgctgatgg	ggtatgcgtt	2160
tttgctgca	tggcaatact	ggctggcgcg	atatcagacg	ccgcatcatc	gtttacagtc	2220
cggcattgat	gccgtgcttc	atgtactgga	ttgggtgccg	gttcgtcttg	cgggtgtggg	2280
atatgccttg	atcggtcatg	gtgagaaagc	gttacccggc	tggtttgctt	cgtcgggtga	2340
ttccatact	tcgcagtatc	aggtgttaac	gcgtctggcg	cagttctctc	tggcgcgtga	2400
accgcatgtc	gataagggtg	agacgccgaa	ggcagcgggt	tcaatggcga	agaaaacctc	2460
gttcgtggtc	gtggtgggtga	ttgcactact	gacgatttac	ggggcgttgg	tgtaaagatt	2520
attgccctca	ccctgtacgg	gtgagggcgt	agagagatta	atgcgctttt	acggctttgg	2580
cggttttctc	tttaaacaga	tagccgatac	ctaacacgat	cagccatacc	gggatcaggt	2640
ataccgaaat	cgccattcct	ggggtcatca	gcataatcac	cagtaccgcc	gccataaaca	2700
gcaggcagat	ccagttaccc	agcggataaa	gcagagcagg	gaagcgagtt	accacgcctt	2760
gttcctgctt	ggcgcgacgg	aatttcatat	gcgccaggct	aatcatcgcc	cagttgatta	2820
ccagtgcaga	taccaccagc	gccattaaca	gtccgaaagc	ggactctggg	gcaaggtagt	2880
taatcagtac	gcacaacgcc	gttaccagtg	cagacaccag	aatggtattt	actggtacac	2940
cacgtttatc	gacagacgcc	agcgcctttg	gcgcattacc	ctgttgtagc	agaccaaaca	3000
gcatacggct	gttgcaatat	acgcagctgt	tgtacacgga	gagcgcgcga	gtcagtagca	3060
cgatgttcag	cgcattcgcc	acaaaggtag	cgcctaactc	gtggaagatc	agcacaacgc	3120
gactggtagc	ggcggtaacg	cgggtccacg	gcatacagta	gagcagaacg	gctaacgaac	3180
caatatagaa	aatcaggatg	cggtagataa	cctgggttagt	tgctttcggg	atactttgct	3240
ccgggttatc	agcttctgct	gcgggtgatcc	ccaccagttc	cagaccaccg	aacgagaaca	3300

tgataatcgc	catcatcacc	accagcccg	tgaagccgtg	cggcaggaaa	ccaccctgat	3360
cccacagggt	gctaaccggtc	gcctgcgggc	cgcggttgcc	actgaatagc	agccagccgc	3420
cgaagatgat	catcgctacc	accgcgataa	ctttgataat	ggcaaaccag	aactccatct	3480
cgccaaacac	tttaacgttg	gtcagggttga	tggcgttaat	caccacaaag	aatacggcgg	3540
cagaaaccca	ggtgggggatt	tccggatacc	agaactgaat	gtattttacc	acggcagtca	3600
gctcagccat	ggcaactaaa	acgtacagta	cccagtagtt	ccagccagag	gcgaaaccgg	3660
caaaactgcc	ccagtattta	taagcaaagt	ggctaaagga	gcctgcgaca	ggttcttcga	3720
ccaccatttc	accagctga	cgcattgatca	gaaaggcgat	aaaaccagca	atggcgtaac	3780
ccaggataat	ccctggccct	gcggactgta	ttacggaggc	gctaccagag	aataaccggg	3840
tccctatcgc	gccaccacgc	gcgataagct	gaatatggcg	gttttttaagg	ccgcgcttta	3900
gctgctcgc	gtgctgttga	cottccatca	tgaaacctcg	tgcggtggtt	gttttttttga	3960
tctacgcagt	gatgcgtgtg	taagtttgca	attccgtttg	ttgtattaat	ttgtttacat	4020
caaagaagtt	tgaattgtta	caaaaagact	tccgtcagat	caagaataat	ggtatgcggc	4080
agcgaatgca	ccgcgtttat	gcatggttga	agatgagttg	cttaaaaaga	aaccgtttgt	4140
aaagctcagc	ctcaaccctt	ctcaatatgt	agaatgaatt	taaattcggt	ttaattgaat	4200
taaaaatcac	aaaattggta	agtgaatcgg	ttcaattcgg	attttttatag	tttaataatc	4260
gttaaaaaac	tccttttcta	cgtaaagtct	acattttgtg	atagttacaa	ctttgaaacg	4320
ttatatatgt	caagttgtta	aaatgtgcac	agtttccatga	tttcaatcaa	aacctgtatg	4380
gacataaggt	gaatactttg	ttacttttagc	gtcacagaca	tgaaattggg	aagaccaatt	4440
gacttcggca	agtggcttaa	gacaggaact	catggcctac	agcaaaatcc	gccaaccaaa	4500
actctccgat	gtgattgagc	agcaactgga	gtttttgatc	ctcgaaggca	ctctccgccc	4560
gggcgaaaaa	ctcccaccgg	aacgcgaact	ggcaaaacag	tttgacgtct	ccgctccctc	4620
cttgcgtag	gcgattcaac	gtctcgaagc	gaagggttg	ttgcttcgtc	gccagggtgg	4680
cggcactttt	gtccagagca	gcctatggca	aagcttcagc	gatccgctgg	tggagctgct	4740
ctccgaccat	cctgagtcac	agtatgactt	gtctcgaaaca	cgacacgccc	tgggaaggtat	4800
cgccgcttat	tacgccgcgc	tgcgtagtac	cgatgaagac	aaggaaacgc	tccgtgaact	4860
ccaccacgcc	atagagctgg	cgcagcagtc	tggcgatctg	gacgcggaat	caaacgccgt	4920
actccagtat	cagattgccg	tcaccgaagc	ggcccacaat	gtggttctgc	ttcatctgct	4980
aaggtgtatg	gagccgatgt	tggcccagaa	tgtccgccag	aacttcgaat	tgtcttattc	5040

gcgtcgcgag atgctgccgc tggtagtag tcaccgcacc cgcataatttg aagcgattat 5100
ggccggtaag ccggaagaag cgcgcgaagc atcgcacgc catctggcct ttatcgaaga 5160
aatittgctc gacagaagtc gtgaagagag ccgccgtgag cgttctctgc gtcgtctgga 5220
gcaacgaaag aattagtgat ttttctggta aaaattatcc agaagatggt gtaaatacaag 5280
cgcatataaa agcgcggcaa ctaaactgtag aacctgtctt attgagcttt ccggcgagag 5340
ttcaatggga caggttccag aaaactcaac gttattagat agataaggaa taaccc atg 5399
Met
1

tca gaa cgt ttc cca aat gac gtg gat ccg atc gaa act cgc gac tgg 5447
Ser Glu Arg Phe Pro Asn Asp Val Asp Pro Ile Glu Thr Arg Asp Trp
5 10 15

ctc cag gcg atc gaa tcg gtc atc cgt gaa gaa ggt gtt gag cgt gct 5495
Leu Gln Ala Ile Glu Ser Val Ile Arg Glu Glu Gly Val Glu Arg Ala
20 25 30

cag tat ctg atc gac caa ctg ctt gct gaa gcc cgc aaa ggc ggt gta 5543
Gln Tyr Leu Ile Asp Gln Leu Leu Ala Glu Ala Arg Lys Gly Gly Val
35 40 45

aac gta gcc gca ggc aca ggt atc agc aac tac atc aac acc atc ccc 5591
Asn Val Ala Ala Gly Thr Gly Ile Ser Asn Tyr Ile Asn Thr Ile Pro
50 55 60 65

gtt gaa gaa caa ccg gag tat ccg ggt aat ctg gaa ctg gaa cgc cgt 5639
Val Glu Glu Gln Pro Glu Tyr Pro Gly Asn Leu Glu Leu Glu Arg Arg
70 75 80

att cgt tca gct atc cgc tgg aac gcc atc atg acg gtg ctg cgt gcg 5687
Ile Arg Ser Ala Ile Arg Trp Asn Ala Ile Met Thr Val Leu Arg Ala
85 90 95

tcg aaa aaa gac ctc gaa ctg ggc ggc cat atg gcg tcc ttc cag tct 5735
Ser Lys Lys Asp Leu Glu Leu Gly Gly His Met Ala Ser Phe Gln Ser
100 105 110

tcc gca acc att tat gat gtg tgc ttt aac cac ttc ttc cgt gca cgc 5783
Ser Ala Thr Ile Tyr Asp Val Cys Phe Asn His Phe Phe Arg Ala Arg
115 120 125

aac gag cag gat ggc ggc gac ctg gtt tac ttc cag ggc cac atc tcc 5831
Asn Glu Gln Asp Gly Gly Asp Leu Val Tyr Phe Gln Gly His Ile Ser
130 135 140 145

ccg ggc gtg tac gct cgt gct ttc ctg gaa ggt cgt ctg act cag gag 5879
Pro Gly Val Tyr Ala Arg Ala Phe Leu Glu Gly Arg Leu Thr Gln Glu
150 155 160

cag ctg gat aac ttc cgt cag gaa gtt cac ggc aat ggc ctc tct tcc 5927
Gln Leu Asp Asn Phe Arg Gln Glu Val His Gly Asn Gly Leu Ser Ser

165										170										175										
tat	ccg	cac	ccg	aaa	ctg	atg	ccg	gaa	ttc	tgg	cag	ttc	ccg	acc	gta	5975														
Tyr	Pro	His	Pro	Lys	Leu	Met	Pro	Glu	Phe	Trp	Gln	Phe	Pro	Thr	Val															
		180						185					190																	
tct	atg	ggt	ctg	ggt	ccg	att	ggt	gct	att	tac	cag	gct	aaa	ttc	ctg	6023														
Ser	Met	Gly	Leu	Gly	Pro	Ile	Gly	Ala	Ile	Tyr	Gln	Ala	Lys	Phe	Leu															
		195				200					205																			
aaa	tat	ctg	gaa	cac	cgt	ggc	ctg	aaa	gat	acc	tct	aaa	caa	acc	gtt	6071														
Lys	Tyr	Leu	Glu	His	Arg	Gly	Leu	Lys	Asp	Thr	Ser	Lys	Gln	Thr	Val															
210					215					220					225															
tac	gcg	ttc	ctc	ggt	gac	ggt	gaa	atg	gac	gaa	ccg	gaa	tcc	aaa	ggt	6119														
Tyr	Ala	Phe	Leu	Gly	Asp	Gly	Glu	Met	Asp	Glu	Pro	Glu	Ser	Lys	Gly															
				230					235						240															
gcg	atc	acc	atc	gct	acc	cgt	gaa	aaa	ctg	gat	aac	ctg	gtc	ttc	gtt	6167														
Ala	Ile	Thr	Ile	Ala	Thr	Arg	Glu	Lys	Leu	Asp	Asn	Leu	Val	Phe	Val															
			245					250					255																	
atc	aac	tgt	aac	ctg	cag	cgt	ctt	gac	ggc	ccg	gtc	acc	ggt	aac	ggc	6215														
Ile	Asn	Cys	Asn	Leu	Gln	Arg	Leu	Asp	Gly	Pro	Val	Thr	Gly	Asn	Gly															
		260					265					270																		
aag	atc	atc	aac	gaa	ctg	gaa	ggc	atc	ttc	gaa	ggt	gct	ggc	tgg	aac	6263														
Lys	Ile	Ile	Asn	Glu	Leu	Glu	Gly	Ile	Phe	Glu	Gly	Ala	Gly	Trp	Asn															
	275					280					285																			
gtg	atc	aaa	gtg	atg	tgg	ggt	agc	cgt	tgg	gat	gaa	ctg	ctg	cgt	aag	6311														
Val	Ile	Lys	Val	Met	Trp	Gly	Ser	Arg	Trp	Asp	Glu	Leu	Leu	Arg	Lys															
290					295					300					305															
gat	acc	agc	ggt	aaa	ctg	atc	cag	ctg	atg	aac	gaa	acc	gtt	gac	ggc	6359														
Asp	Thr	Ser	Gly	Lys	Leu	Ile	Gln	Leu	Met	Asn	Glu	Thr	Val	Asp	Gly															
				310					315					320																
gac	tac	cag	acc	ttc	aaa	tcg	aaa	gat	ggt	gcg	tac	gtt	cgt	gaa	cac	6407														
Asp	Tyr	Gln	Thr	Phe	Lys	Ser	Lys	Asp	Gly	Ala	Tyr	Val	Arg	Glu	His															
			325					330					335																	
ttc	ttc	ggt	aaa	tat	cct	gaa	acc	gca	gca	ctg	gtt	gca	gac	tgg	act	6455														
Phe	Phe	Gly	Lys	Tyr	Pro	Glu	Thr	Ala	Ala	Leu	Val	Ala	Asp	Trp	Thr															
		340					345					350																		
gac	gag	cag	atc	tgg	gca	ctg	aac	cgt	ggt	ggt	cac	gat	ccg	aag	aaa	6503														
Asp	Glu	Gln	Ile	Trp	Ala	Leu	Asn	Arg	Gly	Gly	His	Asp	Pro	Lys	Lys															
	355					360					365																			
atc	tac	gct	gca	ttc	aag	aaa	gcg	cag	gaa	acc	aaa	ggc	aaa	gcg	aca	6551														
Ile	Tyr	Ala	Ala	Phe	Lys	Lys	Ala	Gln	Glu	Thr	Lys	Gly	Lys	Ala	Thr															
370					375					380					385															
gta	atc	ctt	gct	cat	acc	att	aaa	ggt	tac	ggc	atg	ggc	gac	gcg	gct	6599														
Val	Ile	Leu	Ala	His	Thr	Ile	Lys	Gly	Tyr	Gly	Met	Gly	Asp	Ala	Ala															
				390					395					400																

165 170 175
 180 185 190
 195 200 205
 210 215 220 225
 230 235 240
 245 250 255
 260 265 270
 275 280 285
 290 295 300 305
 310 315 320
 325 330 335
 340 345 350
 355 360 365
 370 375 380 385
 390 395 400

gaa ggt aaa aac atc gcg cac cag gtt aag aaa atg aac atg gac ggt	6647
Glu Gly Lys Asn Ile Ala His Gln Val Lys Lys Met Asn Met Asp Gly	
405 410 415	
gtg cgt cat atc cgc gac cgt ttc aat gtg ccg gtg tct gat gca gat	6695
Val Arg His Ile Arg Asp Arg Phe Asn Val Pro Val Ser Asp Ala Asp	
420 425 430	
atc gaa aaa ctg ccg tac atc acc ttc ccg gaa ggt tct gaa gag cat	6743
Ile Glu Lys Leu Pro Tyr Ile Thr Phe Pro Glu Gly Ser Glu Glu His	
435 440 445	
acc tat ctg cac gct cag cgt cag aaa ctg cac ggt tat ctg cca agc	6791
Thr Tyr Leu His Ala Gln Arg Gln Lys Leu His Gly Tyr Leu Pro Ser	
450 455 460 465	
cgt cag ccg aac ttc acc gag aag ctt gag ctg ccg agc ctg caa gac	6839
Arg Gln Pro Asn Phe Thr Glu Lys Leu Glu Leu Pro Ser Leu Gln Asp	
470 475 480	
ttc ggc gcg ctg ttg gaa gag cag agc aaa gag atc tct acc act atc	6887
Phe Gly Ala Leu Leu Glu Glu Gln Ser Lys Glu Ile Ser Thr Thr Ile	
485 490 495	
gct ttc gtt cgt gct ctg aac gtg atg ctg aag aac aag tcg atc aaa	6935
Ala Phe Val Arg Ala Leu Asn Val Met Leu Lys Asn Lys Ser Ile Lys	
500 505 510	
gat cgt ctg gta ccg atc atc gcc gac gaa gcg cgt act ttc ggt atg	6983
Asp Arg Leu Val Pro Ile Ile Ala Asp Glu Ala Arg Thr Phe Gly Met	
515 520 525	
gaa ggt ctg ttc cgt cag att ggt att tac agc ccg aac ggt cag cag	7031
Glu Gly Leu Phe Arg Gln Ile Gly Ile Tyr Ser Pro Asn Gly Gln Gln	
530 535 540 545	
tac acc ccg cag gac cgc gag cag gtt gct tac tat aaa gaa gac gag	7079
Tyr Thr Pro Gln Asp Arg Glu Gln Val Ala Tyr Tyr Lys Glu Asp Glu	
550 555 560	
aaa ggt cag att ctg cag gaa ggg atc aac gag ctg ggc gca ggt tgt	7127
Lys Gly Gln Ile Leu Gln Glu Gly Ile Asn Glu Leu Gly Ala Gly Cys	
565 570 575	
tcc tgg ctg gca gcg gog acc tct tac agc acc aac aat ctg ccg atg	7175
Ser Trp Leu Ala Ala Ala Thr Ser Tyr Ser Thr Asn Asn Leu Pro Met	
580 585 590	
atc ccg ttc tac atc tat tac tcg atg ttc ggc ttc cag cgt att ggc	7223
Ile Pro Phe Tyr Ile Tyr Tyr Ser Met Phe Gly Phe Gln Arg Ile Gly	
595 600 605	
gat ctg tgc tgg gcg gct ggc gac cag caa gcg cgt ggc ttc ctg atc	7271
Asp Leu Cys Trp Ala Ala Gly Asp Gln Gln Ala Arg Gly Phe Leu Ile	
610 615 620 625	

gaa ggt aaa aac atc gcg cac cag gtt aag aaa atg aac atg gac ggt
Glu Gly Lys Asn Ile Ala His Gln Val Lys Lys Met Asn Met Asp Gly
405 410 415

gtg cgt cat atc cgc gac cgt ttc aat gtg ccg gtg tct gat gca gat
Val Arg His Ile Arg Asp Arg Phe Asn Val Pro Val Ser Asp Ala Asp
420 425 430

atc gaa aaa ctg ccg tac atc acc ttc ccg gaa ggt tct gaa gag cat
Ile Glu Lys Leu Pro Tyr Ile Thr Phe Pro Glu Gly Ser Glu Glu His
435 440 445

acc tat ctg cac gct cag cgt cag aaa ctg cac ggt tat ctg cca agc
Thr Tyr Leu His Ala Gln Arg Gln Lys Leu His Gly Tyr Leu Pro Ser
450 455 460 465

cgt cag ccg aac ttc acc gag aag ctt gag ctg ccg agc ctg caa gac
Arg Gln Pro Asn Phe Thr Glu Lys Leu Glu Leu Pro Ser Leu Gln Asp
470 475 480

ttc ggc gcg ctg ttg gaa gag cag agc aaa gag atc tct acc act atc
Phe Gly Ala Leu Leu Glu Glu Gln Ser Lys Glu Ile Ser Thr Thr Ile
485 490 495

gct ttc gtt cgt gct ctg aac gtg atg ctg aag aac aag tcg atc aaa
Ala Phe Val Arg Ala Leu Asn Val Met Leu Lys Asn Lys Ser Ile Lys
500 505 510

gat cgt ctg gta ccg atc atc gcc gac gaa gcg cgt act ttc ggt atg
Asp Arg Leu Val Pro Ile Ile Ala Asp Glu Ala Arg Thr Phe Gly Met
515 520 525

gaa ggt ctg ttc cgt cag att ggt att tac agc ccg aac ggt cag cag
Glu Gly Leu Phe Arg Gln Ile Gly Ile Tyr Ser Pro Asn Gly Gln Gln
530 535 540 545

tac acc ccg cag gac cgc gag cag gtt gct tac tat aaa gaa gac gag
Tyr Thr Pro Gln Asp Arg Glu Gln Val Ala Tyr Tyr Lys Glu Asp Glu
550 555 560

aaa ggt cag att ctg cag gaa ggg atc aac gag ctg ggc gca ggt tgt
Lys Gly Gln Ile Leu Gln Glu Gly Ile Asn Glu Leu Gly Ala Gly Cys
565 570 575

tcc tgg ctg gca gcg gog acc tct tac agc acc aac aat ctg ccg atg
Ser Trp Leu Ala Ala Ala Thr Ser Tyr Ser Thr Asn Asn Leu Pro Met
580 585 590

atc ccg ttc tac atc tat tac tcg atg ttc ggc ttc cag cgt att ggc
Ile Pro Phe Tyr Ile Tyr Tyr Ser Met Phe Gly Phe Gln Arg Ile Gly
595 600 605

gat ctg tgc tgg gcg gct ggc gac cag caa gcg cgt ggc ttc ctg atc
Asp Leu Cys Trp Ala Ala Gly Asp Gln Gln Ala Arg Gly Phe Leu Ile
610 615 620 625

ggc ggt act tcc ggt cgt acc acc ctg aac ggc gaa ggt ctg cag cac	7319
Gly Gly Thr Ser Gly Arg Thr Thr Leu Asn Gly Glu Gly Leu Gln His	
630 635 640	
gaa gat ggt cac agc cac att cag tcc ctg act atc ccg aac tgt atc	7367
Glu Asp Gly His Ser His Ile Gln Ser Leu Thr Ile Pro Asn Cys Ile	
645 650 655	
tct tac gac ccg gct tac gct tac gaa gtt gct gtc atc atg cat gac	7415
Ser Tyr Asp Pro Ala Tyr Ala Tyr Glu Val Ala Val Ile Met His Asp	
660 665 670	
ggc ctg gag cgt atg tac ggt gaa aaa caa gag aac gtt tac tac tac	7463
Gly Leu Glu Arg Met Tyr Gly Glu Lys Gln Glu Asn Val Tyr Tyr Tyr	
675 680 685	
atc act acg ctg aac gaa aac tac cac atg ccg gca atg ccg gaa ggt	7511
Ile Thr Thr Leu Asn Glu Asn Tyr His Met Pro Ala Met Pro Glu Gly	
690 695 700 705	
gct gag gaa ggt atc cgt aaa ggt atc tac aaa ctc gaa act att gaa	7559
Ala Glu Glu Gly Ile Arg Lys Gly Ile Tyr Lys Leu Glu Thr Ile Glu	
710 715 720	
ggc agc aaa ggt aaa gtt cag ctg ctc ggc tcc ggt tct atc ctg cgt	7607
Gly Ser Lys Gly Lys Val Gln Leu Leu Gly Ser Gly Ser Ile Leu Arg	
725 730 735	
cac gtc cgt gaa gca gct gag atc ctg gcg aaa gat tac ggc gta ggt	7655
His Val Arg Glu Ala Ala Glu Ile Leu Ala Lys Asp Tyr Gly Val Gly	
740 745 750	
tct gac gtt tat agc gtg acc tcc ttc acc gag ctg gcg cgt gat ggt	7703
Ser Asp Val Tyr Ser Val Thr Ser Phe Thr Glu Leu Ala Arg Asp Gly	
755 760 765	
cag gat tgt gaa cgc tgg aac atg ctg cac ccg ctg gaa act ccg cgc	7751
Gln Asp Cys Glu Arg Trp Asn Met Leu His Pro Leu Glu Thr Pro Arg	
770 775 780 785	
gtt ccg tat atc gct cag gtg atg aac gac gct ccg gca gtg gca tct	7799
Val Pro Tyr Ile Ala Gln Val Met Asn Asp Ala Pro Ala Val Ala Ser	
790 795 800	
acc gac tat atg aaa ctg ttc gct gag cag gtc cgt act tac gta ccg	7847
Thr Asp Tyr Met Lys Leu Phe Ala Glu Gln Val Arg Thr Tyr Val Pro	
805 810 815	
gct gac gac tac cgc gta ctg ggt act gat ggc ttc ggt cgt tcc gac	7895
Ala Asp Asp Tyr Arg Val Leu Gly Thr Asp Gly Phe Gly Arg Ser Asp	
820 825 830	
agc cgt gag aac ctg cgt cac cac ttc gaa gtt gat gct tct tat gtc	7943
Ser Arg Glu Asn Leu Arg His His Phe Glu Val Asp Ala Ser Tyr Val	
835 840 845	
gtg gtt gcg gcg ctg ggc gaa ctg gct aaa cgt ggc gaa atc gat aag	7991

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

Val 850	Val	Ala	Ala	Leu	Gly 855	Glu	Leu	Ala	Lys	Arg	Gly	Glu	Ile	Asp	Lys 865		
aaa Lys	gtg Val	gtt Val	gct Ala	gac Asp	gca Ala	atc Ile	gcc Ala	aaa Lys	ttc Phe	aac Asn	atc Ile	gat Asp	gca Ala	gat Asp	aaa Lys	8039	
				870					875					880			
gtt Val	aac Asn	ccg Pro	cgt Arg	ctg Leu	gcg Ala	taa	gag	gta	aaa	aag	aata	atg Met	gct Ala	atc Ile	gaa Glu	atc Ile	8089
			885										890				
aaa Lys	gta Val	ccg Pro	gac Asp	atc Ile	ggg Gly	gct Ala	gat Asp	gaa Glu	gtt Val	gaa Glu	atc Ile	acc Thr	gag Glu	atc Ile	ctg Leu	8137	
	895					900					905						
gtc Val	aaa Lys	gtg Val	ggc Gly	gac Asp	aaa Lys	gtt Val	gaa Glu	gcc Ala	gaa Glu	cag Gln	tcg Ser	ctg Leu	atc Ile	acc Thr	gta Val	8185	
910					915					920					925		
gaa Glu	ggc Gly	gac Asp	aaa Lys	gcc Ala	tct Ser	atg Met	gaa Glu	gtt Val	ccg Pro	tct Ser	ccg Pro	cag Gln	gcg Ala	ggg Gly	atc Ile	8233	
				930					935					940			
gtt Val	aaa Lys	gag Glu	atc Ile	aaa Lys	gtc Val	tct Ser	gtt Val	ggc Gly	gat Asp	aaa Lys	acc Thr	cag Gln	acc Thr	ggc Gly	gca Ala	8281	
			945					950					955				
ctg Leu	att Ile	atg Met	att Ile	ttc Phe	gat Asp	tcc Ser	gcc Ala	gac Asp	ggg Gly	gca Ala	gca Ala	gac Asp	gct Ala	gca Ala	cct Pro	8329	
		960					965					970					
gct Ala	cag Gln	gca Ala	gaa Glu	gag Glu	aag Lys	aaa Lys	gaa Glu	gca Ala	gct Ala	ccg Pro	gca Ala	gca Ala	gca Ala	cca Pro	gcg Ala	8377	
975						980					985						
gct Ala	gcg Ala	gcg Ala	gca Ala	aaa Lys	gac Asp	gtt Val	aac Asn	gtt Val	ccg Pro	gat Asp	atc Ile	ggc Gly	agc Ser	gac Asp	gaa Glu	8425	
990					995				1000					1005			
gtt Val	gaa Glu	gtg Val	acc Thr	gaa Glu	atc Ile	ctg Leu	gtg Val	aaa Lys	gtt Val	ggc Gly	gat Asp	aaa Lys	gtt Val	gaa Glu	gct Ala	8473	
			1010					1015					1020				
gaa Glu	cag Gln	tcg Ser	ctg Leu	atc Ile	acc Thr	gta Val	gaa Glu	ggc Gly	gac Asp	aag Lys	gct Ala	tct Ser	atg Met	gaa Glu	gtt Val	8521	
1025							1030					1035					
ccg Pro	gct Ala	ccg Pro	ttt Phe	gct Ala	ggc Gly	acc Thr	gtg Val	aaa Lys	gag Glu	atc Ile	aaa Lys	gtg Val	aac Asn	gtg Val	ggg Gly	8569	
		1040					1045				1050						
gac Asp	aaa Lys	gtg Val	tct Ser	acc Thr	ggc Gly	tcg Ser	ctg Leu	att Ile	atg Met	gtc Val	ttc Phe	gaa Glu	gtc Val	gcg Ala	ggg Gly	8617	
1055					1060					1065							
gaa Glu	gca Ala	ggc Gly	gcg Ala	gca Ala	gct Ala	ccg Pro	gcc Ala	gct Ala	aaa Lys	cag Gln	gaa Glu	gca Ala	gct Ala	ccg Pro	gca Ala	8665	

1070	1075	1080	1085	
gcg gcc cct gca cca gcg gct ggc gtg aaa gaa gtt aac gtt ccg gat				8713
Ala Ala Pro Ala Pro Ala Ala Gly Val Lys Glu Val Asn Val Pro Asp				
1090	1095	1100		
atc ggc ggt gac gaa gtt gaa gtg act gaa gtg atg gtg aaa gtg ggc				8761
Ile Gly Gly Asp Glu Val Glu Val Thr Glu Val Met Val Lys Val Gly				
1105	1110	1115		
gac aaa gtt gcc gct gaa cag tca ctg atc acc gta gaa ggc gac aaa				8809
Asp Lys Val Ala Ala Glu Gln Ser Leu Ile Thr Val Glu Gly Asp Lys				
1120	1125	1130		
gct tct atg gaa gtt ccg gcg ccg ttt gca ggc gtc gtg aag gaa ctg				8857
Ala Ser Met Glu Val Pro Ala Pro Phe Ala Gly Val Val Lys Glu Leu				
1135	1140	1145		
aaa gtc aac gtt ggc gat aaa gtg aaa act ggc tcg ctg att atg atc				8905
Lys Val Asn Val Gly Asp Lys Val Lys Thr Gly Ser Leu Ile Met Ile				
1150	1155	1160	1165	
ttc gaa gtt gaa ggc gca gcg cct gcg gca gct cct gcg aaa cag gaa				8953
Phe Glu Val Glu Gly Ala Ala Pro Ala Ala Ala Pro Ala Lys Gln Glu				
1170	1175	1180		
gcg gca gcg ccg gca ccg gca gca aaa gct gaa gcc ccg gca gca gca				9001
Ala Ala Ala Pro Ala Pro Ala Ala Lys Ala Glu Ala Pro Ala Ala Ala				
1185	1190	1195		
cca gct gcg aaa gcg gaa ggc aaa tct gaa ttt gct gaa aac gac gct				9049
Pro Ala Ala Lys Ala Glu Gly Lys Ser Glu Phe Ala Glu Asn Asp Ala				
1200	1205	1210		
tat gtt cac gcg act ccg ctg atc cgc cgt ctg gca cgc gag ttt ggt				9097
Tyr Val His Ala Thr Pro Leu Ile Arg Arg Leu Ala Arg Glu Phe Gly				
1215	1220	1225		
gtt aac ctt gcg aaa gtg aag ggc act ggc cgt aaa ggt cgt atc ctg				9145
Val Asn Leu Ala Lys Val Lys Gly Thr Gly Arg Lys Gly Arg Ile Leu				
1230	1235	1240	1245	
cgc gaa gac gtt cag gct tac gtg aaa gaa gct atc aaa cgt gca gaa				9193
Arg Glu Asp Val Gln Ala Tyr Val Lys Glu Ala Ile Lys Arg Ala Glu				
1250	1255	1260		
gca gct ccg gca gcg act ggc ggt ggt atc cct ggc atg ctg ccg tgg				9241
Ala Ala Pro Ala Ala Thr Gly Gly Gly Ile Pro Gly Met Leu Pro Trp				
1265	1270	1275		
ccg aag gtg gac ttc agc aag ttt ggt gaa atc gaa gaa gtg gaa ctg				9289
Pro Lys Val Asp Phe Ser Lys Phe Gly Glu Ile Glu Glu Val Glu Leu				
1280	1285	1290		
ggc cgc atc cag aaa atc tct ggt gcg aac ctg agc cgt aac tgg gta				9337
Gly Arg Ile Gln Lys Ile Ser Gly Ala Asn Leu Ser Arg Asn Trp Val				
1295	1300	1305		

The first 1000 amino acids of the protein are shown. The sequence is from the cDNA of the human gene. The sequence is from the cDNA of the human gene.

atg atc ccg cat gtt act cac ttc gac aaa acc gat atc acc gag ttg 9385
 Met Ile Pro His Val Thr His Phe Asp Lys Thr Asp Ile Thr Glu Leu
 1310 1315 1320 1325

gaa gcg ttc cgt aaa cag cag aac gaa gaa gcg gcg aaa cgt aag ctg 9433
 Glu Ala Phe Arg Lys Gln Gln Asn Glu Glu Ala Ala Lys Arg Lys Leu
 1330 1335 1340

gat gtg aag atc acc ccg gtt gtc ttc atc atg aaa gcc gtt gct gca 9481
 Asp Val Lys Ile Thr Pro Val Val Phe Ile Met Lys Ala Val Ala Ala
 1345 1350 1355

gct ctt gag cag atg cct cgc ttc aat agt tcg ctg tcg gaa gac ggt 9529
 Ala Leu Glu Gln Met Pro Arg Phe Asn Ser Ser Leu Ser Glu Asp Gly
 1360 1365 1370

cag cgt ctg acc ctg aag aaa tac atc aac atc ggt gtg gcg gtg gat 9577
 Gln Arg Leu Thr Leu Lys Lys Tyr Ile Asn Ile Gly Val Ala Val Asp
 1375 1380 1385

acc ccg aac ggt ctg gtt gtt ccg gta ttc aaa gac gtc aac aag aaa 9625
 Thr Pro Asn Gly Leu Val Val Pro Val Phe Lys Asp Val Asn Lys Lys
 1390 1395 1400 1405

ggc atc atc gag ctg tct cgc gag ctg atg act att tct aag aaa gcg 9673
 Gly Ile Ile Glu Leu Ser Arg Glu Leu Met Thr Ile Ser Lys Lys Ala
 1410 1415 1420

cgt gac ggt aag ctg act gcg ggc gaa atg cag ggc ggt tgc ttc acc 9721
 Arg Asp Gly Lys Leu Thr Ala Gly Glu Met Gln Gly Gly Cys Phe Thr
 1425 1430 1435

atc tcc agc atc ggc ggc ctg ggt act acc cac ttc gcg ccg att gtg 9769
 Ile Ser Ser Ile Gly Gly Leu Gly Thr Thr His Phe Ala Pro Ile Val
 1440 1445 1450

aac gcg ccg gaa gtg gct atc ctc ggc gtt tcc aag tcc gcg atg gag 9817
 Asn Ala Pro Glu Val Ala Ile Leu Gly Val Ser Lys Ser Ala Met Glu
 1455 1460 1465

ccg gtg tgg aat ggt aaa gag ttc gtg ccg cgt ctg atg ctg ccg att 9865
 Pro Val Trp Asn Gly Lys Glu Phe Val Pro Arg Leu Met Leu Pro Ile
 1470 1475 1480 1485

tct ctc tcc ttc gac cac cgc gtg atc gac ggt gct gat ggt gcc cgt 9913
 Ser Leu Ser Phe Asp His Arg Val Ile Asp Gly Ala Asp Gly Ala Arg
 1490 1495 1500

ttc att acc atc att aac aac acg ctg tct gac att cgc cgt ctg gtg 9961
 Phe Ile Thr Ile Ile Asn Asn Thr Leu Ser Asp Ile Arg Arg Leu Val
 1505 1510 1515

atg taa gtaaaagagc cggcccaacg gccggctttt ttctggtaat ctcatgaatg 10017
 Met

tattgagggt attagcgaat agacaaatcg gttgccgttt gttgtttaaa aattgttaac 10077

aattttgtaa aataccgacg gatagaacga cccggtggtg gttagggtat tacttcacat 10137
 accctatgga tttctgggtg 10157

<210> 4

<211> 887

<212> PRT

<213> Escherichia coli

<400> 4

Met	Ser	Glu	Arg	Phe	Pro	Asn	Asp	Val	Asp	Pro	Ile	Glu	Thr	Arg	Asp	1	5	10	15
Trp	Leu	Gln	Ala	Ile	Glu	Ser	Val	Ile	Arg	Glu	Glu	Gly	Val	Glu	Arg	20	25	30	
Ala	Gln	Tyr	Leu	Ile	Asp	Gln	Leu	Leu	Ala	Glu	Ala	Arg	Lys	Gly	Gly	35	40	45	
Val	Asn	Val	Ala	Ala	Gly	Thr	Gly	Ile	Ser	Asn	Tyr	Ile	Asn	Thr	Ile	50	55	60	
Pro	Val	Glu	Glu	Gln	Pro	Glu	Tyr	Pro	Gly	Asn	Leu	Glu	Leu	Glu	Arg	65	70	75	80
Arg	Ile	Arg	Ser	Ala	Ile	Arg	Trp	Asn	Ala	Ile	Met	Thr	Val	Leu	Arg	85	90	95	
Ala	Ser	Lys	Lys	Asp	Leu	Glu	Leu	Gly	Gly	His	Met	Ala	Ser	Phe	Gln	100	105	110	
Ser	Ser	Ala	Thr	Ile	Tyr	Asp	Val	Cys	Phe	Asn	His	Phe	Phe	Arg	Ala	115	120	125	
Arg	Asn	Glu	Gln	Asp	Gly	Gly	Asp	Leu	Val	Tyr	Phe	Gln	Gly	His	Ile	130	135	140	
Ser	Pro	Gly	Val	Tyr	Ala	Arg	Ala	Phe	Leu	Glu	Gly	Arg	Leu	Thr	Gln	145	150	155	160
Glu	Gln	Leu	Asp	Asn	Phe	Arg	Gln	Glu	Val	His	Gly	Asn	Gly	Leu	Ser	165	170	175	
Ser	Tyr	Pro	His	Pro	Lys	Leu	Met	Pro	Glu	Phe	Trp	Gln	Phe	Pro	Thr	180	185	190	
Val	Ser	Met	Gly	Leu	Gly	Pro	Ile	Gly	Ala	Ile	Tyr	Gln	Ala	Lys	Phe	195	200	205	
Leu	Lys	Tyr	Leu	Glu	His	Arg	Gly	Leu	Lys	Asp	Thr	Ser	Lys	Gln	Thr	210	215	220	
Val	Tyr	Ala	Phe	Leu	Gly	Asp	Gly	Glu	Met	Asp	Glu	Pro	Glu	Ser	Lys	225	230	235	240

Gly	Ala	Ile	Thr	Ile	Ala	Thr	Arg	Glu	Lys	Leu	Asp	Asn	Leu	Val	Phe		
				245					250					255			
Val	Ile	Asn	Cys	Asn	Leu	Gln	Arg	Leu	Asp	Gly	Pro	Val	Thr	Gly	Asn		
			260					265					270				
Gly	Lys	Ile	Ile	Asn	Glu	Leu	Glu	Gly	Ile	Phe	Glu	Gly	Ala	Gly	Trp		
		275					280					285					
Asn	Val	Ile	Lys	Val	Met	Trp	Gly	Ser	Arg	Trp	Asp	Glu	Leu	Leu	Arg		
	290					295					300						
Lys	Asp	Thr	Ser	Gly	Lys	Leu	Ile	Gln	Leu	Met	Asn	Glu	Thr	Val	Asp		
305					310					315					320		
Gly	Asp	Tyr	Gln	Thr	Phe	Lys	Ser	Lys	Asp	Gly	Ala	Tyr	Val	Arg	Glu		
				325					330					335			
His	Phe	Phe	Gly	Lys	Tyr	Pro	Glu	Thr	Ala	Ala	Leu	Val	Ala	Asp	Trp		
			340				345						350				
Thr	Asp	Glu	Gln	Ile	Trp	Ala	Leu	Asn	Arg	Gly	Gly	His	Asp	Pro	Lys		
		355					360					365					
Lys	Ile	Tyr	Ala	Ala	Phe	Lys	Lys	Ala	Gln	Glu	Thr	Lys	Gly	Lys	Ala		
	370					375					380						
Thr	Val	Ile	Leu	Ala	His	Thr	Ile	Lys	Gly	Tyr	Gly	Met	Gly	Asp	Ala		
385					390				395						400		
Ala	Glu	Gly	Lys	Asn	Ile	Ala	His	Gln	Val	Lys	Lys	Met	Asn	Met	Asp		
				405					410					415			
Gly	Val	Arg	His	Ile	Arg	Asp	Arg	Phe	Asn	Val	Pro	Val	Ser	Asp	Ala		
			420					425					430				
Asp	Ile	Glu	Lys	Leu	Pro	Tyr	Ile	Thr	Phe	Pro	Glu	Gly	Ser	Glu	Glu		
		435					440					445					
His	Thr	Tyr	Leu	His	Ala	Gln	Arg	Gln	Lys	Leu	His	Gly	Tyr	Leu	Pro		
	450					455					460						
Ser	Arg	Gln	Pro	Asn	Phe	Thr	Glu	Lys	Leu	Glu	Leu	Pro	Ser	Leu	Gln		
465					470					475					480		
Asp	Phe	Gly	Ala	Leu	Leu	Glu	Glu	Gln	Ser	Lys	Glu	Ile	Ser	Thr	Thr		
				485					490					495			
Ile	Ala	Phe	Val	Arg	Ala	Leu	Asn	Val	Met	Leu	Lys	Asn	Lys	Ser	Ile		
			500					505					510				
Lys	Asp	Arg	Leu	Val	Pro	Ile	Ile	Ala	Asp	Glu	Ala	Arg	Thr	Phe	Gly		
		515					520					525					
Met	Glu	Gly	Leu	Phe	Arg	Gln	Ile	Gly	Ile	Tyr	Ser	Pro	Asn	Gly	Gln		
	530					535					540						

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Gln Tyr Thr Pro Gln Asp Arg Glu Gln Val Ala Tyr Tyr Lys Glu Asp
 545 550 555 560
 Glu Lys Gly Gln Ile Leu Gln Glu Gly Ile Asn Glu Leu Gly Ala Gly
 565 570 575
 Cys Ser Trp Leu Ala Ala Ala Thr Ser Tyr Ser Thr Asn Asn Leu Pro
 580 585 590
 Met Ile Pro Phe Tyr Ile Tyr Tyr Ser Met Phe Gly Phe Gln Arg Ile
 595 600 605
 Gly Asp Leu Cys Trp Ala Ala Gly Asp Gln Gln Ala Arg Gly Phe Leu
 610 615 620
 Ile Gly Gly Thr Ser Gly Arg Thr Thr Leu Asn Gly Glu Gly Leu Gln
 625 630 635 640
 His Glu Asp Gly His Ser His Ile Gln Ser Leu Thr Ile Pro Asn Cys
 645 650 655
 Ile Ser Tyr Asp Pro Ala Tyr Ala Tyr Glu Val Ala Val Ile Met His
 660 665 670
 Asp Gly Leu Glu Arg Met Tyr Gly Glu Lys Gln Glu Asn Val Tyr Tyr
 675 680 685
 Tyr Ile Thr Thr Leu Asn Glu Asn Tyr His Met Pro Ala Met Pro Glu
 690 695 700
 Gly Ala Glu Glu Gly Ile Arg Lys Gly Ile Tyr Lys Leu Glu Thr Ile
 705 710 715 720
 Glu Gly Ser Lys Gly Lys Val Gln Leu Leu Gly Ser Gly Ser Ile Leu
 725 730 735
 Arg His Val Arg Glu Ala Ala Glu Ile Leu Ala Lys Asp Tyr Gly Val
 740 745 750
 Gly Ser Asp Val Tyr Ser Val Thr Ser Phe Thr Glu Leu Ala Arg Asp
 755 760 765
 Gly Gln Asp Cys Glu Arg Trp Asn Met Leu His Pro Leu Glu Thr Pro
 770 775 780
 Arg Val Pro Tyr Ile Ala Gln Val Met Asn Asp Ala Pro Ala Val Ala
 785 790 795 800
 Ser Thr Asp Tyr Met Lys Leu Phe Ala Glu Gln Val Arg Thr Tyr Val
 805 810 815
 Pro Ala Asp Asp Tyr Arg Val Leu Gly Thr Asp Gly Phe Gly Arg Ser
 820 825 830
 Asp Ser Arg Glu Asn Leu Arg His His Phe Glu Val Asp Ala Ser Tyr
 835 840 845

Val Val Val Ala Ala Leu Gly Glu Leu Ala Lys Arg Gly Glu Ile Asp
850 855 860

Lys Lys Val Val Ala Asp Ala Ile Ala Lys Phe Asn Ile Asp Ala Asp
865 870 875 880

Lys Val Asn Pro Arg Leu Ala
885

<210> 5

<211> 630

<212> PRT

<213> Escherichia coli

<400> 5

Met Ala Ile Glu Ile Lys Val Pro Asp Ile Gly Ala Asp Glu Val
1 5 10 15

Glu Ile Thr Glu Ile Leu Val Lys Val Gly Asp Lys Val Glu Ala Glu
20 25 30

Gln Ser Leu Ile Thr Val Glu Gly Asp Lys Ala Ser Met Glu Val Pro
35 40 45

Ser Pro Gln Ala Gly Ile Val Lys Glu Ile Lys Val Ser Val Gly Asp
50 55 60

Lys Thr Gln Thr Gly Ala Leu Ile Met Ile Phe Asp Ser Ala Asp Gly
65 70 75

Ala Ala Asp Ala Ala Pro Ala Gln Ala Glu Glu Lys Lys Glu Ala Ala
80 85 90 95

Pro Ala Ala Ala Pro Ala Ala Ala Ala Ala Lys Asp Val Asn Val Pro
100 105 110

Asp Ile Gly Ser Asp Glu Val Glu Val Thr Glu Ile Leu Val Lys Val
115 120 125

Gly Asp Lys Val Glu Ala Glu Gln Ser Leu Ile Thr Val Glu Gly Asp
130 135 140

Lys Ala Ser Met Glu Val Pro Ala Pro Phe Ala Gly Thr Val Lys Glu
145 150 155

Ile Lys Val Asn Val Gly Asp Lys Val Ser Thr Gly Ser Leu Ile Met
160 165 170 175

Val Phe Glu Val Ala Gly Glu Ala Gly Ala Ala Ala Pro Ala Ala Lys
180 185 190

Gln Glu Ala Ala Pro Ala Ala Ala Pro Ala Pro Ala Ala Gly Val Lys
195 200 205

Glu Val Asn Val Pro Asp Ile Gly Gly Asp Glu Val Glu Val Thr Glu
210 215 220

1000 900 800 700 600 500 400 300 200 100 0

Val 225	Met	Val	Lys	Val	Gly	Asp 230	Lys	Val	Ala	Ala	Glu	Gln	Ser	Leu	Ile
Thr 240	Val	Glu	Gly	Asp	Lys 245	Ala	Ser	Met	Glu	Val	Pro	Ala	Pro	Phe	Ala 255
Gly	Val	Val	Lys	Glu 260	Leu	Lys	Val	Asn	Val	Gly	Asp	Lys	Val	Lys	Thr 270
Gly	Ser	Leu	Ile 275	Met	Ile	Phe	Glu	Val 280	Glu	Gly	Ala	Ala	Pro	Ala	Ala
Ala	Pro	Ala 290	Lys	Gln	Glu	Ala	Ala 295	Ala	Pro	Ala	Pro	Ala	Ala	Lys	Ala
Glu	Ala 305	Pro	Ala	Ala	Ala	Pro 310	Ala	Ala	Lys	Ala	Glu	Gly	Lys	Ser	Glu
Phe 320	Ala	Glu	Asn	Asp	Ala 325	Tyr	Val	His	Ala	Thr 330	Pro	Leu	Ile	Arg	Arg 335
Leu	Ala	Arg	Glu	Phe 340	Gly	Val	Asn	Leu	Ala 345	Lys	Val	Lys	Gly	Thr 350	Gly
Arg	Lys	Gly	Arg 355	Ile	Leu	Arg	Glu	Asp 360	Val	Gln	Ala	Tyr	Val	Lys	Glu
Ala	Ile	Lys 370	Arg	Ala	Glu	Ala	Ala 375	Pro	Ala	Ala	Thr	Gly	Gly	Gly	Ile
Pro	Gly 385	Met	Leu	Pro	Trp	Pro 390	Lys	Val	Asp	Phe	Ser 395	Lys	Phe	Gly	Glu
Ile 400	Glu	Glu	Val	Glu	Leu 405	Gly	Arg	Ile	Gln	Lys 410	Ile	Ser	Gly	Ala	Asn 415
Leu	Ser	Arg	Asn	Trp 420	Val	Met	Ile	Pro	His 425	Val	Thr	His	Phe	Asp 430	Lys
Thr	Asp	Ile	Thr 435	Glu	Leu	Glu	Ala	Phe 440	Arg	Lys	Gln	Gln	Asn	Glu	Glu
Ala	Ala	Lys 450	Arg	Lys	Leu	Asp	Val 455	Lys	Ile	Thr	Pro	Val	Val	Phe	Ile
Met	Lys 465	Ala	Val	Ala	Ala	Ala 470	Leu	Glu	Gln	Met	Pro 475	Arg	Phe	Asn	Ser
Ser 480	Leu	Ser	Glu	Asp	Gly 485	Gln	Arg	Leu	Thr	Leu 490	Lys	Lys	Tyr	Ile	Asn 495
Ile	Gly	Val	Ala	Val 500	Asp	Thr	Pro	Asn	Gly 505	Leu	Val	Val	Pro	Val 510	Phe
Lys	Asp	Val	Asn 515	Lys	Lys	Gly	Ile 520	Ile	Glu	Leu	Ser	Arg	Glu 525	Leu	Met

Thr Ile Ser Lys Lys Ala Arg Asp Gly Lys Leu Thr Ala Gly Glu Met
530 535 540

Gln Gly Gly Cys Phe Thr Ile Ser Ser Ile Gly Gly Leu Gly Thr Thr
545 550 555

His Phe Ala Pro Ile Val Asn Ala Pro Glu Val Ala Ile Leu Gly Val
560 565 570 575

Ser Lys Ser Ala Met Glu Pro Val Trp Asn Gly Lys Glu Phe Val Pro
580 585 590

Arg Leu Met Leu Pro Ile Ser Leu Ser Phe Asp His Arg Val Ile Asp
595 600 605

Gly Ala Asp Gly Ala Arg Phe Ile Thr Ile Ile Asn Asn Thr Leu Ser
610 615 620

Asp Ile Arg Arg Leu Val Met
625 630

<210> 6

<211> 10863

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (9596)..(10798)

<400> 6

gactgtcggc gcagtaagct tcgcgaaata gatttaggaa taagcgaaga aaaatccctt 60

tgccgacagg cgcaaattaa atctcgtcag gtgtacgcag gttagttacg gcaatgcgtt 120

caccgcgctt gcgttcgcgc tctgattgca tattggcgcg ataaacgccc tgatcgccaa 180

ccaccagga gagcggacga cgttctttgc cgatagattc ctgcaacagc atcagtgcct 240

gcatgtacgc ttcaggacgc ggcgggcagc ccgggatata cacatcaacc gggatgaatt 300

tatcgacgcc ctgcacaacg gaataaatat cgtacatacc accagagttg gcacaggcac 360

ccattgagat aaccattttt ggttcagca tctggtcata cagacgtga ataaccggtg 420

ccattttggt aaagcagggt cctgcaacca ccatcaggtc agcctgacgc ggcgaagcac 480

gcaatacttc tgcgccaaaa cgcgccacgt catgcaccgc ggtaaacgaa gtcaccatct 540

caacgtaaca gcaggaaaga ccgaagttat acggccaaat tgagttttta cgaccccagt 600

taaccatgtc attgagcttg ccataaaca cgtttttggt aacttcttgc tccagagggg 660

cggttacgat ctctgctttt tgcagggggg aacggtcggt ctcaccgttg ggatctatgc 720

gactgtcggc gcagtaagct tcgcgaaata gatttaggaa taagcgaaga aaaatccctt 60
tgccgacagg cgcaaattaa atctcgtcag gtgtacgcag gttagttacg gcaatgcgtt 120
caccgcgctt gcgttcgcgc tctgattgca tattggcgcg ataaacgccc tgatcgccaa 180
ccaccagga gagcggacga cgttctttgc cgatagattc ctgcaacagc atcagtgcct 240
gcatgtacgc ttcaggacgc ggcgggcagc ccgggatata cacatcaacc gggatgaatt 300
tattcgacgcc ctgcacaacg gaataaatat cgtacatacc accagagttg gcacaggcac 360
ccattgagat aaccattttt ggttcagca tctggtcata cagacgtga ataaccggtg 420
ccattttggt aaagcagggt cctgcaacca ccatcaggtc agcctgacgc ggcgaagcac 480
gcaatacttc tgcgccaaaa cgcgccacgt catgcaccgc ggtaaacgaa gtcaccatct 540
caacgtaaca gcaggaaaga ccgaagttat acggccaaat tgagttttta cgaccccagt 600
taaccatgtc attgagcttg ccataaaca cgtttttggt aacttcttgc tccagagggg 660
cggttacgat ctctgctttt tgcagggggg aacggtcggt ctcaccgttg ggatctatgc 720

gggtgagcgt	ataatccatc	ttaatgcctc	gcggttagcg	ttgacgatta	gcgatactgt	780
tcgtttccgg	gttcatacgc	tcgogggcgtg	aacgcgcggg	cgtccagtcc	agcgcgccaa	840
tacgcaccag	ataaaccaga	cctgccagta	acacaaaaat	aaaaattgca	gcttccacaa	900
agcctacca	gccgctttcg	cggatagagg	ttgaccatgc	gaacagatac	agcgcttcaa	960
cgtcgaagat	aacgaagaac	atggccacca	gataaaactt	ggcggacagg	cgtaagcggg	1020
cggagccgac	cgagtcgata	coggattcaa	acggcacggt	tttcgacctc	gcgcgtgcgc	1080
gaccgcctaa	aaaccaaccg	cctaccagca	tcaggcaaca	caggccaatg	gcaacgataa	1140
gaaagatagc	gaatgccag	tgatgagcga	tgacttcagt	ggatgttgac	atactcattg	1200
cttactcatc	aaaagtagcg	ccagattcac	tgctcttcac	ggcagatgga	cgccacatcg	1260
attcatgggg	aggaataaaa	aaaaccttac	aatcactgta	gaaattcttt	tatacagcta	1320
attgatgtgg	ttttttactc	ctttctataa	ccttttgtca	actttaacaa	aagtttcttc	1380
acattagttt	acataatatc	aacaccatta	gcattttaatg	ccctttcacc	ccagatcctt	1440
gacgactcca	ggataattag	atgttgttga	atcgtgtccg	ttgtgaagca	atggaaaaaa	1500
tacgggtcta	ttttgacagg	aatttggtgc	gattcctccc	cccaaagag	agtattttct	1560
tgatctgtga	cacgcttttg	tcattccata	acaaaaacgc	agcaacaaat	ttacgtattt	1620
tttaacatca	ttgtagcagg	tgattttttt	caggcgatta	tttgtgcgtt	cgggacgtga	1680
atctctggtg	gttgaaaaat	gaacagtttt	gtacgttctg	cactatgcga	tgaaggattt	1740
ttactaaaaa	aaagccgctg	gggtttaaaa	cacccccagc	ggctcgtttt	ttacactatt	1800
gtctcaggaa	ttatctatcg	tccgtcgatt	actcgatatc	cctttcaatc	aacaatgaat	1860
catccccctc	cggagcagac	attgggctgt	attgccacgg	attatggtag	ctctccatcg	1920
cctgatagat	cacctgggcc	agctcattat	tactggacgg	atcatagcac	agcaaataat	1980
cggtatcagg	tagcggcggt	aagccatcta	ctccactcag	cacacgcagg	tccgggctca	2040
tcattctaac	cggccttgcc	gtcacgcaa	gaccggcttt	cactgccgca	cgaacggccg	2100
gaagcgtcga	ggcgacataa	gccagtcgcc	atggaatata	tgcctttatta	agcgtcgcca	2160
gcaccatatc	gcgaaacggg	ctaggatcat	ccagcaatac	aagagggatc	ggctcgcttt	2220
tttgcaatat	gtattccgct	gcgcagtacc	agtgtgttgg	cgaggtacgc	aggttcaatg	2280
ccttaaacgc	tgaaggacga	tgggtgggta	ccatcaaata	cacttctctg	gattccagca	2340
tttctgccat	ataggcatta	cgtttaacgc	ggacatccag	cgctaatttc	ggataaaccg	2400
aactcacgcg	atttaacagg	aaaggtgaaga	tcgtatcggc	agattoatat	gaagcaccca	2460

tagttaatac gccctgaaga ttactgaaca ttaatgatga gcaggcctca tcattaaaac 2520
 gcaggatttt cctggcgtaa ccaagaagtt gaatgccatg ttcagttaac agtttggtgc 2580
 gaccgtgacg agcgaacagt tctttcccaa cgagttgttc cagacgctgc atttgctgac 2640
 ttacggcgga ctgagtacga cacacagcg cagctgcggc agcaaaagtg ttcagatcgg 2700
 caacagcaac aaatgttctc agcagatcga ggtcgagggtt aattatcgga cgatttgac 2760
 ttatcatata ttatcactta ctggcggtc atactgagct ggttaatgct gtgcacacac 2820
 aaacaagcaa ttccatttgt aatgtgcctc cctggcagtt tcatccgaa cccggacgaa 2880
 agtaaaaatg catatgagtt gcactaaaa agcgactcac attgttccgt tataatgcct 2940
 gaagtagatc acagaatata tcttcagga tcgcatatct attaagttac tcaactcttt 3000
 ctatttatga catgcgcgtg tttgtataaa tgtaaatgtg agtccttggt ccaactctgt 3060
 gcagcatcgc tggtcatacg cgaacacgta ccaacagcaa tggtagaggc gcataagag 3120
 cagggatccg tcatttatcc gagcatttta ccccaaaaac cttttattta taagggtcat 3180
 tgcgaattat ctgatgcaa gttatgttat gttaggcaa gtaatcttct attattaata 3240
 agcacatcaa aacctttttg aatattaaat aataattaat tagcatcatc ctcattcatt 3300
 aattccgctt aacaatagtt tcacaccttg ccccatctgc gacacctcgg aaatcatcac 3360
 gcagttaaac tctccgtaat gaggaaatat catcatcgcg tttcattagt gaattcttaa 3420
 atgaggcatt ttcacacaat tatcttacag ataaaaaac cagacttaca attaagaatc 3480
 agaacaattc actatataac attgcatgta aagcatatac acctcattat tttgtcatta 3540
 ttaagttatt aacagcacia tcgagccttc ccctctggca aaatcttatt ctgcagacct 3600
 tcaaaacacc gtcctggggg agtacattgt tctaagctga cttccacggc agggagtggc 3660
 gataacagca aaaaagggtc agattcatgt ccccatctga aaaatccagc aaattagaga 3720
 atgtctgtta tgacatccgt ggtccggtgc tgaaagaagc aaaacgcctg gaagaagaag 3780
 gtaacaagggt actgaaactg aacatcggca acccagcccc gttcggtttt gacgcgccag 3840
 atgaaatcct cgttgacgtg atacgcaacc tgcctaccgc tcaagggtat tgcgattcca 3900
 aagggtctta ctccgcgctg aaagccatca tgcagcacta ccaggctcgt ggcattgcgtg 3960
 atgttaccgt ggaagatatt tacatcggca atggtgtatc ggagcttatc gttcaggcaa 4020
 tgcaggcatt gctgaacagc ggggacgaaa tgttggttcc tgcaccagat taccactct 4080
 ggaccgcggc ggtttcgtt tccagcggtg aagcgggtgca ttatctttgc gatgaatcct 4140

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000 33000 34000 35000 36000 37000 38000 39000 40000 41000 42000 43000 44000 45000 46000 47000 48000 49000 50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000 64000 65000 66000 67000 68000 69000 70000 71000 72000 73000 74000 75000 76000 77000 78000 79000 80000 81000 82000 83000 84000 85000 86000 87000 88000 89000 90000 91000 92000 93000 94000 95000 96000 97000 98000 99000 100000

11

gccatcaaca	ccgccgtcgc	ggtattagag	ataaatagcc	caataaccgc	cgacaagaca	5940
aacaaacacc	ccagcatcat	atgtggcccg	taaccaccgc	caatgtccat	cagccctttc	6000
accgccagcg	cgacacctcc	cgttttctgt	aatgccacag	caaacggcat	catcccaacg	6060
atcaaaataa	tgctcggcca	gtgaatggat	ttataggcgc	tttcagcatc	tatacagcgg	6120
aatttcccca	tcagcaggca	ggcgatgata	gcggaacag	gattaggaat	ttcatctgtc	6180
agcattaacg	ccaccattag	caccagacag	aaaatggcat	ggggtgcctg	gctgtgcgcg	6240
ggtgatgctt	cactcacctc	ttcggtaag	ttcagcgcta	cgaagtcgcg	gccctgtttg	6300
gccagcatac	cgatcagttt	ccagttaccc	acaaccagga	tgatatcgcc	cagcagcaga	6360
ggctcatccg	ccagcgaacc	ttccagcgcc	acgccattgc	gctttagccc	caccacattc	6420
agtccgtagc	gggtacgaaa	accaatttcg	cgacccgatt	taccaatcag	ttctgactca	6480
ggaattaatg	aaatctctgc	catgccaca	tcaagggcct	ggtcagaaaa	atactcgccg	6540
cgcagtacca	tcggctccag	caattgctca	ctacaaaatt	gccggagatc	gacatcagcc	6600
gcagacatat	caataagcaa	aacgtcacgc	gcgcgaaatt	cagaaacccc	attaacgttc	6660
acgataacgc	gacgaaaacg	ccgccagcgt	tcaacacoga	tgacgttagc	gccataacgc	6720
tcacgtaatt	tgagatcatc	cagccgttga	ccaatcattg	gcgatccggg	gcgaatagcc	6780
agacgtcgcg	cacgcccggc	cagtcgatat	tcacggataa	gatcgcgaaa	ggttcgacgc	6840
gtccagcctt	cgcgctgcgc	ggtctgggta	tcccctttca	gcatgaaacg	catcactaac	6900
atatacaaaa	taccagcac	cagcacgacc	aggccaatag	gtgttacgct	aaagaaactg	6960
aagccgtgat	agccttcacg	cagcaattca	ctgttgacta	ccagggttcg	ggcgctcgcc	7020
accagcgtca	tcatgccgct	aatcagcccg	gcaaaactta	acggcatcat	cagacgtgac	7080
ggcgacgttt	gcatacgc	ggcaacgctt	aacaccacgc	gaataaagat	agcgacaacg	7140
ccggttgaac	tcataaacgc	gccaaagccc	gcgacggtoa	gcatcaacaa	aaccaacatt	7200
ttgatttcac	tattgcccgc	aactttgacc	agccatgttc	ccattacggt	ggcaacaccg	7260
gtacggacca	aaccatcgcc	aataataaac	aaggcggcaa	tcaggacaac	gttaggatca	7320
gaaaagccgg	aaaatacttc	tgggactgtc	agcgttccgc	ttaatgcaaa	cgcgacaata	7380
acaaacaaag	cgaccgc	catacgcact	ctgcccgctc	caaacaagac	gatggcaacg	7440
gccagtaatg	aaagaacca	aatcaattca	ccgttcacaa	cttatccttg	ttaattgagg	7500
gggatgactt	gattctgcca	taaaaaagcc	ccgacgagac	ggggctaaat	catgatcagg	7560

tgtttcactg	aataataaca	tgcgccatttg	gctgtttggt	cacagtaatt	tgctccagac	7620
tgtggaggac	caaatcgacc	tcattcaggc	gcgggggtatc	tgccggagcg	ttaaccgcaa	7680
tgacatgaca	accgcgcgcc	agggccagaaa	gcacgccagc	gggagcatct	tccaccacca	7740
cacactcctg	cggcgcgaagc	cccagcagct	gcgcgcctaa	cagatacgca	tcaggttctg	7800
gttttcgcg	cttcaactgc	tcagcgggta	caaacacctc	tggtgcggga	agcccagcta	7860
ttttatggcg	cgctcgcgct	accggcatgg	agccagaagt	cacaatggcc	cacggaatac	7920
ctgcctttatt	caaatgactg	agtaaggcga	ttgcccccg	aagcgcggta	ataccttcg	7980
tttcggtggc	ctcgatgtgc	tccagacgcg	taaactcggc	ggcaatatca	gcctcggatt	8040
tgcccgccat	aaaatggcgc	agagaggtga	tcgcctgttt	accgtgaatg	aaagccagca	8100
cctcttcgcg	cgctaaccga	tgacgtctgg	cccagttgct	ccacgcccg	tctaccgcag	8160
gcagggaatc	caccagcggt	ccatcaagat	caaacagaaa	acctttgcac	cgcacgcggg	8220
cctcctcagg	cattgataat	ttgattaatt	tcgttggcgc	tcaaattggt	ctgacgcggg	8280
caggcatgcc	acacattaag	catgcgctga	tatttttccc	acattggcgt	ctgggcgtta	8340
aaaccgtgag	ttccggcgtc	aaaatgggta	tagcgccctt	ccacattaac	cataaagcgg	8400
acataaccga	ggtaacgtgc	ttcagtggcg	gcgtcaaagc	cgaggaaggt	gacacgacgt	8460
tcatcgatgg	attgctggtc	ctgcaaatta	gaccaggaaa	catgcaacgc	atgatacatc	8520
tccataatgt	cgatgatagt	gcggcagggt	tcttctttca	gctcgccaaa	ctcgcgatcc	8580
aattcacgca	tctgtaatcc	gtaaccacgc	tcaataattg	tttgaggcg	acggtaacgt	8640
tcagcatttg	ccggatcgag	catagtcatc	atcttgta	gattagacaa	aataagacgt	8700
tgcgcgttgg	tcatttccat	tgttgactcc	tgtatcactc	tactacggtg	aaaaaaaaa	8760
aggctgagta	cgccctcttt	tatatgcgta	atcaggggtc	aattacaaat	catcaaggaa	8820
agtttttatcc	agttgtttga	aggcgcgcct	aagcgtgtca	gctaattgct	ggtaatcagg	8880
cttgcccttca	acgggtgcca	acacctgtcc	agactcctgc	aatttaccgc	gaacttcata	8940
aaaccagtta	aggattgcag	ggggtaatgg	cgtgacagaa	cgcttgccca	gccaccacaa	9000
tccctgcatg	ggtaaaactta	aggcgaacag	ggcagtgcca	actgccggcc	caagctgacc	9060
gcccagggca	atctgccagc	agagagtaaa	taaggcgatc	ggcggcataa	aacggatcgc	9120
ataacgcgtc	atcttgataa	cgcgattttc	gacaaagacc	ggggcaaggc	gtttttccag	9180
cggccacgtc	tttgagtaat	gctgtccccg	gcgaaacaag	ctaaaaaat	taacagaacg	9240
attatccggc	gttgacatgc	ttcacctcaa	cttcacatat	aaagattcaa	aaatttgtgc	9300

aaattcacaa ctcagcggga caacgttcaa aacattttgt cttccataacc cactatcagg 9360
 taticcttttag cagcctgaag gcctaagtag tacatatcca ttgagtcgtc aaattcatat 9420
 acattatgcc attggctgaa aattacgcaa aatggcatag actcaagata tttcttccat 9480
 catgcaaaaa aaatttgcag tgcattgatgt taatcataaa tgtcgggtgtc atcatgcgct 9540
 acgctctatg gctccctgac gtttttttag ccacgtatca attataggta cttcc atg 9598
 Met
 1
 tcg agt aag tta gta ctg gtt ctg aac tgc ggt agt tct tca ctg aaa 9646
 Ser Ser Lys Leu Val Leu Val Leu Asn Cys Gly Ser Ser Ser Leu Lys
 5 10 15
 ttt gcc atc atc gat gca gta aat ggt gaa gag tac ctt tct ggt tta 9694
 Phe Ala Ile Ile Asp Ala Val Asn Gly Glu Glu Tyr Leu Ser Gly Leu
 20 25 30
 gcc gaa tgt ttc cac ctg ccc gaa gca cgt atc aaa tgg aaa atg gac 9742
 Ala Glu Cys Phe His Leu Pro Glu Ala Arg Ile Lys Trp Lys Met Asp
 35 40 45
 ggc aat aaa cag gaa gcg gct tta ggt gca ggc gcc gct cac agc gaa 9790
 Gly Asn Lys Gln Glu Ala Ala Leu Gly Ala Gly Ala Ala His Ser Glu
 50 55 60 65
 gcg ctc aac ttt atc gtt aat act att ctg gca caa aaa cca gaa ctg 9838
 Ala Leu Asn Phe Ile Val Asn Thr Ile Leu Ala Gln Lys Pro Glu Leu
 70 75 80
 tct gcg cag ctg act gct atc ggt cac cgt atc gta cac ggc ggc gaa 9886
 Ser Ala Gln Leu Thr Ala Ile Gly His Arg Ile Val His Gly Gly Glu
 85 90 95
 aag tat acc agc tcc gta gtg atc gat gag tct gtt att cag ggt atc 9934
 Lys Tyr Thr Ser Ser Val Val Ile Asp Glu Ser Val Ile Gln Gly Ile
 100 105 110
 aaa gat gca gct tct ttt gca ccg ctg cac aac ccg gct cac ctg atc 9982
 Lys Asp Ala Ala Ser Phe Ala Pro Leu His Asn Pro Ala His Leu Ile
 115 120 125
 ggt atc gaa gaa gct ctg aaa tct ttc cca cag ctg aaa gac aaa aac 10030
 Gly Ile Glu Glu Ala Leu Lys Ser Phe Pro Gln Leu Lys Asp Lys Asn
 130 135 140 145
 gtt gct gta ttt gac acc gcg ttc cac cag act atg ccg gaa gag tct 10078
 Val Ala Val Phe Asp Thr Ala Phe His Gln Thr Met Pro Glu Glu Ser
 150 155 160
 tac ctc tac gcc ctg cct tac aac ctg tac aaa gag cac ggc atc cgt 10126
 Tyr Leu Tyr Ala Leu Pro Tyr Asn Leu Tyr Lys Glu His Gly Ile Arg
 165 170 175

cgt tac ggc gcg cac ggc acc agc cac ttc tat gta acc cag gaa gcg 10174
 Arg Tyr Gly Ala His Gly Thr Ser His Phe Tyr Val Thr Gln Glu Ala
 180 185 190

gca aaa atg ctg aac aaa ccg gta gaa gaa ctg aac atc atc acc tgc 10222
 Ala Lys Met Leu Asn Lys Pro Val Glu Glu Leu Asn Ile Ile Thr Cys
 195 200 205

cac ctg ggc aac ggt ggt tcc gtt tct gct atc cgc aac ggt aaa tgc 10270
 His Leu Gly Asn Gly Gly Ser Val Ser Ala Ile Arg Asn Gly Lys Cys
 210 215 220 225

gtt gac acc tct atg ggc ctg acc ccg ctg gaa ggt ctg gtc atg ggt 10318
 Val Asp Thr Ser Met Gly Leu Thr Pro Leu Glu Gly Leu Val Met Gly
 230 235 240

acc cgt tct ggt gat atc gat ccg gcg atc atc ttc cac ctg cac gac 10366
 Thr Arg Ser Gly Asp Ile Asp Pro Ala Ile Ile Phe His Leu His Asp
 245 250 255

acc ctg ggc atg agc gtt gac gca atc aac aaa ctg ctg acc aaa gag 10414
 Thr Leu Gly Met Ser Val Asp Ala Ile Asn Lys Leu Leu Thr Lys Glu
 260 265 270

tct ggc ctg ctg ggt ctg acc gaa gtg acc agc gac tgc cgc tat gtt 10462
 Ser Gly Leu Leu Gly Leu Thr Glu Val Thr Ser Asp Cys Arg Tyr Val
 275 280 285

gaa gac aac tac gcg acg aaa gaa gac gcg aag cgc gca atg gac gtt 10510
 Glu Asp Asn Tyr Ala Thr Lys Glu Asp Ala Lys Arg Ala Met Asp Val
 290 295 300 305

tac tgc cac cgc ctg gcg aaa tac atc ggt gcc tac act gcg ctg atg 10558
 Tyr Cys His Arg Leu Ala Lys Tyr Ile Gly Ala Tyr Thr Ala Leu Met
 310 315 320

gat ggt cgt ctg gac gct gtt gta ttc act ggt ggt atc ggt gaa aat 10606
 Asp Gly Arg Leu Asp Ala Val Val Phe Thr Gly Gly Ile Gly Glu Asn
 325 330 335

gcc gca atg gtt cgt gaa ctg tct ctg ggc aaa ctg ggc gtg ctg ggc 10654
 Ala Ala Met Val Arg Glu Leu Ser Leu Gly Lys Leu Gly Val Leu Gly
 340 345 350

ttt gaa gtt gat cat gaa cgc aac ctg gct gca cgt ttc ggc aaa tct 10702
 Phe Glu Val Asp His Glu Arg Asn Leu Ala Ala Arg Phe Gly Lys Ser
 355 360 365

ggt ttc atc aac aaa gaa ggt acc cgt cct gcg gtg gtt atc cca acc 10750
 Gly Phe Ile Asn Lys Glu Gly Thr Arg Pro Ala Val Val Ile Pro Thr
 370 375 380 385

aac gaa gaa ctg gtt atc gcg caa gac gcg agc cgc ctg act gcc tga 10798
 Asn Glu Glu Leu Val Ile Ala Gln Asp Ala Ser Arg Leu Thr Ala
 390 395 400

tttcacaccg ccagctcagc tggcgggtgct gttttgtaac ccgccaaatc ggcggtaacg 10858

10863

<211> 400

<212> PRT

<213> Escherichia coli

<400> 7

Met Ser Ser Lys Leu Val Leu Val Leu Asn Cys Gly Ser Ser Ser Leu
1 5 10 15

Lys Phe Ala Ile Ile Asp Ala Val Asn Gly Glu Glu Tyr Leu Ser Gly
20 25 30

Leu Ala Glu Cys Phe His Leu Pro Glu Ala Arg Ile Lys Trp Lys Met
35 40 45

Asp Gly Asn Lys Gln Glu Ala Ala Leu Gly Ala Gly Ala Ala His Ser
50 55 60

Glu Ala Leu Asn Phe Ile Val Asn Thr Ile Leu Ala Gln Lys Pro Glu
65 70 75 80

Leu Ser Ala Gln Leu Thr Ala Ile Gly His Arg Ile Val His Gly Gly
85 90 95

Glu Lys Tyr Thr Ser Ser Val Val Ile Asp Glu Ser Val Ile Gln Gly
100 105 110

Ile Lys Asp Ala Ala Ser Phe Ala Pro Leu His Asn Pro Ala His Leu
115 120 125

Ile Gly Ile Glu Glu Ala Leu Lys Ser Phe Pro Gln Leu Lys Asp Lys
130 135 140

Asn Val Ala Val Phe Asp Thr Ala Phe His Gln Thr Met Pro Glu Glu
145 150 155 160

Ser Tyr Leu Tyr Ala Leu Pro Tyr Asn Leu Tyr Lys Glu His Gly Ile
165 170 175

Arg Arg Tyr Gly Ala His Gly Thr Ser His Phe Tyr Val Thr Gln Glu
180 185 190

Ala Ala Lys Met Leu Asn Lys Pro Val Glu Glu Leu Asn Ile Ile Thr
195 200 205

Cys His Leu Gly Asn Gly Gly Ser Val Ser Ala Ile Arg Asn Gly Lys
210 215 220

Cys Val Asp Thr Ser Met Gly Leu Thr Pro Leu Glu Gly Leu Val Met
225 230 235 240

Gly Thr Arg Ser Gly Asp Ile Asp Pro Ala Ile Ile Phe His Leu His
245 250 255

Asp Thr Leu Gly Met Ser Val Asp Ala Ile Asn Lys Leu Leu Thr Lys
260 265 270

Glu Ser Gly Leu Leu Gly Leu Thr Glu Val Thr Ser Asp Cys Arg Tyr
275 280 285

Val Glu Asp Asn Tyr Ala Thr Lys Glu Asp Ala Lys Arg Ala Met Asp
290 295 300

Val Tyr Cys His Arg Leu Ala Lys Tyr Ile Gly Ala Tyr Thr Ala Leu
305 310 315 320

Met Asp Gly Arg Leu Asp Ala Val Val Phe Thr Gly Gly Ile Gly Glu
325 330 335

Asn Ala Ala Met Val Arg Glu Leu Ser Leu Gly Lys Leu Gly Val Leu
340 345 350

Gly Phe Glu Val Asp His Glu Arg Asn Leu Ala Ala Arg Phe Gly Lys
355 360 365

Ser Gly Phe Ile Asn Lys Glu Gly Thr Arg Pro Ala Val Val Ile Pro
370 375 380

Thr Asn Glu Glu Leu Val Ile Ala Gln Asp Ala Ser Arg Leu Thr Ala
385 390 395 400

<210> 8

<211> 11630

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1163)..(2602)

<400> 8

aattctctgc tgcaagatga ataatgttta tctacagcat ttccttaaaa gatatgtcag 60

gcttgccggag tggcgggttaa ggacatacga tttcctcctt tcagagtgcg ccgcttctca 120

ctattatctc acgcagtatt cttaagggaa cgataaggag gaaccatgaa cattaccccg 180

tttccgacgc tttcgccggc aactatagat gccataaatg ttatcggaca gtggctggcg 240

caggatgatt tctcgggtga ggtgccgtat caggccgatt gcgtgatcct tgcaggcaat 300

gcggttatgc cgactatcga tgcggcatgt aagattgccg gcgatcagca aattccttta 360

ctgattagtg gtggtatcgg tctactcgaca acttttttgt atagcgccat cgcacagcat 420

ccgcactaca acactatccg caccactggc agagcagaag cgaccatcct ggcggatatc 480

gctcatcagt tctggcacat tccgcatgaa aaaatctgga ttgaagacca gtcaacaaac 540

tcg	ggt	gaaa	acgc	acgctt	tag	cat	cgcg	ctatt	gaatc	agg	ccg	taga	acg	agtt	cat	600											
acg	gct	atc	g	ttgtt	cagga	cccc	accatg	cag	cgg	cgc	ca	cgat	ggc	gac	gtt	ccg	ccgt	660									
atg	act	ggg	g	acaat	cccc	ga	tgc	acc	acgc	tgg	tta	agtt	at	ccc	ggatt	cgtt	cct	cag	720								
ttag	gaa	aata	acg	cag	acag	tgt	aat	cttt	atta	at	cagt	taca	agg	gatt	atg	gcc	cag	tt	780								
gag	cgt	tat	c	tct	act	act	ctg	ggc	gag	ctg	ccg	cgtt	tac	gc	gat	ga	tag	c	gat	ggc	840						
tac	ggt	cccc	gcg	ggc	gaga	tttt	at	cgtt	cac	g	ttg	att	tt	ccg	gc	aga	agt	cat	cc	at	900						
gc	at	gg	caaa	cgct	gaa	aca	tgat	gcg	gtg	ct	cat	c	gag	g	at	gg	aaa	ag	tc	gc	gtt	960					
cg	tt	aaaa	at	tg	ccc	gtt	tg	a	acc	actt	gtt	t	g	caa	aac	ggg	cat	g	act	ttt	1020						
att	t	ct	gc	ct	tt	at	tc	ctt	gt	tt	at	t	ga	ag	cc	tt	c	ac	ag	a	att	gt	ctt	1080			
tc	ac	gat	tcc	gt	ct	ct	ct	ga	tg	att	gat	gt	ta	at	ta	a	caa	tgt	att	c	acc	g	aaa	a	caa	aac	1140
at	ata	aat	ca	cag	gag	t	cgc	cc	atg	tca	gta	ccc	g	tt	caa	cat	cct	atg	tat							1192	
									Met	Ser	Val	Pro	Val	Gln	His	Pro	Met	Tyr									
									1																		
atc	gat	gga	cag	ttt	g	tt	acc	tgg	cgt	gga	gac	gca	tgg	att	gat	gtg											1240
Ile	Asp	Gly	Gln	Phe	Val	Thr	Trp	Arg	Gly	Asp	Ala	Trp	Ile	Asp	Val												
				15						20					25												
gta	aac	cct	gct	aca	gag	gct	gtc	att	tcc	cgc	ata	ccc	gat	ggt	cag												1288
Val	Asn	Pro	Ala	Thr	Glu	Ala	Val	Ile	Ser	Arg	Ile	Pro	Asp	Gly	Gln												
				30					35					40													
gcc	gag	gat	gcc	cgt	aag	gca	atc	gat	gca	gca	gaa	cgt	gca	caa	cca												1336
Ala	Glu	Asp	Ala	Arg	Lys	Ala	Ile	Asp	Ala	Ala	Glu	Arg	Ala	Gln	Pro												
				45					50				55														
gaa	tgg	gaa	gcg	ttg	cct	gct	att	gaa	cgc	gcc	agt	tgg	ttg	cgc	aaa												1384
Glu	Trp	Glu	Ala	Leu	Pro	Ala	Ile	Glu	Arg	Ala	Ser	Trp	Leu	Arg	Lys												
				60				65				70															
atc	tcc	gcc	ggg	atc	cgc	gaa	cgc	gcc	agt	gaa	atc	agt	gcg	ctg	att												1432
Ile	Ser	Ala	Gly	Ile	Arg	Glu	Arg	Ala	Ser	Glu	Ile	Ser	Ala	Leu	Ile												
					80					85				90													
gtt	gaa	gaa	ggg	ggc	aag	atc	cag	cag																			

Phe	Lys	Arg	Ala	Leu	Gly	Val	Thr	Thr	Gly	Ile	Leu	Pro	Trp	Asn	Phe		
140						145					150						
ccg	ttc	ttc	ctc	att	gcc	cgc	aaa	atg	gct	ccc	gct	ctt	ttg	acc	ggg	1672	
Pro	Phe	Phe	Leu	Ile	Ala	Arg	Lys	Met	Ala	Pro	Ala	Leu	Leu	Thr	Gly		
155					160					165					170		
aat	acc	atc	gtc	att	aaa	cct	agt	gaa	ttt	acg	cca	aac	aat	gcg	att	1720	
Asn	Thr	Ile	Val	Ile	Lys	Pro	Ser	Glu	Phe	Thr	Pro	Asn	Asn	Ala	Ile		
				175					180					185			
gca	ttc	gcc	aaa	atc	gtc	gat	gaa	ata	ggc	ctt	ccg	cgc	ggc	gtg	ttt	1768	
Ala	Phe	Ala	Lys	Ile	Val	Asp	Glu	Ile	Gly	Leu	Pro	Arg	Gly	Val	Phe		
			190					195					200				
aac	ctt	gta	ctg	ggg	cgt	ggg	gaa	acc	gtt	ggg	caa	gaa	ctg	gcg	ggg	1816	
Asn	Leu	Val	Leu	Gly	Arg	Gly	Glu	Thr	Val	Gly	Gln	Glu	Leu	Ala	Gly		
		205					210					215					
aac	cca	aag	gtc	gca	atg	gtc	agt	atg	aca	ggc	agc	gtc	tct	gca	ggg	1864	
Asn	Pro	Lys	Val	Ala	Met	Val	Ser	Met	Thr	Gly	Ser	Val	Ser	Ala	Gly		
		220				225					230						
gag	aag	atc	atg	gcg	act	gcg	gcg	aaa	aac	atc	acc	aaa	gtg	tgt	ctg	1912	
Glu	Lys	Ile	Met	Ala	Thr	Ala	Ala	Lys	Asn	Ile	Thr	Lys	Val	Cys	Leu		
235				240						245				250			
gaa	ttg	ggg	ggg	aaa	gca	cca	gct	atc	gta	atg	gac	gat	gcc	gat	ctt	1960	
Glu	Leu	Gly	Gly	Lys	Ala	Pro	Ala	Ile	Val	Met	Asp	Asp	Ala	Asp	Leu		
				255				260						265			
gaa	ctg	gca	gtc	aaa	gcc	atc	gtt	gat	tca	cgc	gtc	att	aat	agt	ggg	2008	
Glu	Leu	Ala	Val	Lys	Ala	Ile	Val	Asp	Ser	Arg	Val	Ile	Asn	Ser	Gly		
			270				275						280				
caa	gtg	tgt	aac	tgt	gca	gaa	cgt	gtt	tat	gta	cag	aaa	ggc	att	tat	2056	
Gln	Val	Cys	Asn	Cys	Ala	Glu	Arg	Val	Tyr	Val	Gln	Lys	Gly	Ile	Tyr		
		285					290					295					
gat	cag	ttc	gtc	aat	cgg	ctg	ggg	gaa	gcg	atg	cag	gcg	gtt	caa	ttt	2104	
Asp	Gln	Phe	Val	Asn	Arg	Leu	Gly	Glu	Ala	Met	Gln	Ala	Val	Gln	Phe		
		300				305					310						
ggg	aac	ccc	gct	gaa	cgc	aac	gac	att	gcg	atg	ggg	ccg	ttg	att	aac	2152	
Gly	Asn	Pro	Ala	Glu	Arg	Asn	Asp	Ile	Ala	Met	Gly	Pro	Leu	Ile	Asn		
315					320					325					330		
gcc	gcg	gcg	ctg	gaa	agg	gtc	gag	caa	aaa	gtg	gcg	cgc	gca	gta	gaa	2200	
Ala	Ala	Ala	Leu	Glu	Arg	Val	Glu	Gln	Lys	Val	Ala	Arg	Ala	Val	Glu		
				335				340						345			
gaa	ggg	gcg	aga	gtg	gcg	ttc	ggg	ggc	aaa	gcg	gta	gag	ggg	aaa	gga	2248	
Glu	Gly	Ala	Arg	Val	Ala	Phe	Gly	Gly	Lys	Ala	Val	Glu	Gly	Lys	Gly		
			350					355					360				
tat	tat	tat	ccg	ccg	aca	ttg	ctg	ctg	gat	gtt	cgc	cag	gaa	atg	tcg	2296	
Tyr	Tyr	Tyr	Pro	Pro	Thr	Leu	Leu	Leu	Asp	Val	Arg	Gln	Glu	Met	Ser		

140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315 320 325 330 335 340 345 350 355 360

365					370					375						
att	atg	cat	gag	gaa	acc	ttt	ggc	ccg	gtg	ctg	cca	gtt	gtc	gca	ttt	2344
Ile	Met	His	Glu	Glu	Thr	Phe	Gly	Pro	Val	Leu	Pro	Val	Val	Ala	Phe	
380			385			390										
gac	acg	ctg	gaa	gat	gct	atc	tca	atg	gct	aat	gac	agt	gat	tac	ggc	2392
Asp	Thr	Leu	Glu	Asp	Ala	Ile	Ser	Met	Ala	Asn	Asp	Ser	Asp	Tyr	Gly	
395			400			405			410							
ctg	acc	tca	tca	atc	tat	acc	caa	aat	ctg	aac	gtc	gcg	atg	aaa	gcc	2440
Leu	Thr	Ser	Ser	Ile	Tyr	Thr	Gln	Asn	Leu	Asn	Val	Ala	Met	Lys	Ala	
415			420			425										
att	aaa	ggg	ctg	aag	ttt	ggg	gaa	act	tac	atc	aac	cgt	gaa	aac	ttc	2488
Ile	Lys	Gly	Leu	Lys	Phe	Gly	Glu	Thr	Tyr	Ile	Asn	Arg	Glu	Asn	Phe	
430			435			440										
gaa	gct	atg	caa	ggc	ttc	cac	gcc	gga	tgg	cgt	aaa	tcc	ggg	att	ggc	2536
Glu	Ala	Met	Gln	Gly	Phe	His	Ala	Gly	Trp	Arg	Lys	Ser	Gly	Ile	Gly	
445			450			455										
ggc	gca	gat	ggt	aaa	cat	ggc	ttg	cat	gaa	tat	ctg	cag	acc	cag	gtg	2584
Gly	Ala	Asp	Gly	Lys	His	Gly	Leu	His	Glu	Tyr	Leu	Gln	Thr	Gln	Val	
460			465			470										
gtt	tat	tta	cag	tct	taa	tgagt	gaaag	aggcggaggt	ttttt	cctcc						2632
Val	Tyr	Leu	Gln	Ser												
475			480													
gcctgtgcgc	gtcagagttt	agcgaatttt	tcgaggggtgc	gaataagctg	tgtgacgaag											2692
ccatattcgt	tatcgtacca	ggcgaccgtt	ttcaccagtt	gtaaatcgcc	cacggcggtta											2752
atttccgttt	gcgtggcatc	aaacaccgaa	ccgaaatggc	tgccaatgat	atcggaagag											2812
actattttctt	catcgggtata	accaaattgac	tcgttatttg	tggttgcttg	tttaagtgcg											2872
ttattcacct	cttcggcagt	cacttttttc	cgagaatcga	taccagttca	gtgaccgaac											2932
ctgtttttcac	cggcacgcgt	tgcgcatgac	ctttcagttt	gccgctcagt	tcggggatca											2992
ccagaccaat	ggctttttgcc	gcccccgtag	tgtgggggaat	gatattttct	gccgctgcgc											3052
gtgaagcacg	taaattcttta	ccacgcgggc	catccaccag	tgactgggtg	ccagtatagg											3112
catgaatggt	cgtcatcgtg	ccgacttcta	tcccgaact	gtcatgcaag	gctttggcca											3172
tcggcgcaag	acagtttagtg	gtgcatgacg	ccacggaaac	aatggtgtcg	ttgccatcca											3232
gagtgtcgtc	attgacgtta	taaacgatag	ttttcatttc	accggcaggg	gcggaaatca											3292
acaccttctt	cgcaccagca	tcaagatgcg	cctgcgattt	ctcggcggag	gtataaaaagc											3352
cagtacattc	gacaatgatt	tctgcacctt	tcgctttcca	cggaatat	ttagcctctt											3412
tttcggcgta	aaccgcgata	cttttcccat	caacgataag	tgaattcttc	gtaaaatcaa											3472

cgctccaggg	gaatggtcog	tagtttgaat	catgtttcag	caggtaggcg	agaatttatg	3532
gggaagtgag	atcattaata	gcgacaacgt	ctatgttgct	tttgacttca	agtaatcgac	3592
ccaacaccag	tgcaccgata	cgaccaaacc	cgttaatacc	aactttactc	atggttttct	3652
cctgtcagga	acgttcggat	gaaaattgat	cctttccaag	cttagaccag	gatggcggga	3712
tgggcaatct	ccattctcac	agtgaacgt	aacgtactga	aaacgggtga	acaatattta	3772
atgaaaat	gagaaaagcc	cgttatgtta	acggaaaatt	atgttaaagc	aggaaatgtt	3832
atggaaaata	aatattcaag	gttacaaatc	agcattcact	ggctggctct	tttactgggt	3892
atcgagcgt	attgcgcaat	ggagtttcgt	ggtttcttcc	cacgtagcga	tcgccactc	3952
atcaacatga	ttcatgtttc	ctgtggcacc	tcaattctcg	tgctgatggg	cgttcgtctt	4012
ttgttaaggc	tgaaataccc	aaccccgccg	attataccta	agccaaaacc	gatgatgacg	4072
ggactggcgc	atgtgggaca	tttgggtgatt	tatctcctgt	ttattgcgct	gccagtgatt	4132
ggtttggtga	tgatgtataa	cgggggcaac	cgttggtttg	cgtttggttt	gacgatgcct	4192
tacgcttcag	aggccaat	cgaacgggta	gatagcttaa	agtcgtggca	tgaaacgctg	4252
gcgaatctgg	gatat	catcggttg	cacgctgcgg	ctgcactggc	acaccactat	4312
ttctggaagg	acaacacact	tctacgcgat	atgccgcgta	aacgttcctg	aaggatat	4372
aaagaaaacg	cctgtactaa	aaccgacccg	tggtacaggc	gaagaatacg	ggtctacatc	4432
ggaagcgcct	attatat	tttgtatgat	aaataaaacc	ataatccttg	cccatacgtc	4492
catctggctt	at	aattcaccgc	atctttgatc	tcatcaacgg	tatcaaaata	4552
aaccagcgta	taacgttcaa	atcgaacata	agattcgata	aaccatggag	gttatatgaa	4612
aaaactggca	cttatt	ttatgggaac	gcttgtttcc	ttttatgccg	atgccggggc	4672
caaaccctgt	tctggttcga	aaggggggat	ctcacactgt	acggcaggcg	gcaaatttgt	4732
ctgtaatgat	ggttctatta	gtgcatcgaa	aaaaacatgc	actaactgaa	gtgtaaaagg	4792
ggtgccatga	gaaaatgaat	ctgctagtca	aatgcgcggg	gaaaatcccc	gcgcttgccc	4852
ttacctggac	gtgcaggcca	tgagcgcagc	aacctcctta	tcaccgtccc	ggaaccgcag	4912
ttcgtagagc	gtttgtcggg	tcaggagtgt	gaatgtcaga	atcgtaatgc	agataatgag	4972
cagacacacc	accagagggt	tgtgcttcat	agcctttctc	cttgccggat	ggcgggtaag	5032
aggctaagat	ctgaattgct	aggttcattc	gttggcctcg	gttgatagaa	atatcggtcg	5092
gggccttcgt	ctttctgatt	ccgggttagc	ctgaaaacag	aaagtctcag	gcacccgcag	5152

gcacccctatg	aggttttcctt	agggaacgaaa	ataatcactt	cacgaaattg	cgtgctgttt	5212
tccagaattt	ttcgtcattc	gggttagcca	gttttagccat	tcgttactct	cttcattcca	5272
atagcattaa	ttttctatgc	aataattggt	gtaaaaatgt	gacgcaaaga	ggtttttggt	5332
cataagtaat	taccgtcaag	tgccgatgac	tttctatcag	gagtaaacct	ggacgagaga	5392
caacggtaat	gaatacaact	ccctcacagc	gattaggttt	tttgcatcac	atcaggttgg	5452
ttccgttatt	tgcttgcatt	ctaggcggta	tcttagttct	attcgcatta	agttcagccc	5512
tggtctggcta	tttcctctgg	caggccgatc	gcgatcagcg	tgatgttact	gcggagattg	5572
agattcggac	cgggttagcg	aacagttcag	atTTTTTgcg	ttcagcccgg	atcaatatga	5632
ttcaggccgg	ggctgcgagt	cgtattgcgg	aaatggaagc	aatgaagcga	aatattgcgc	5692
aagccgaatc	ggagattaaa	cagtcgcagc	aaggttatcg	tgcttatcag	aatcgaccgg	5752
tgaaaacacc	tgctgatgaa	gccctcgaca	ctgaattaaa	tcaacgcttt	caggcttata	5812
tcacgggtat	gcaacctatg	ttgaaatatg	ccaaaaatgg	catgtttgaa	gcgattatca	5872
atcatgaaag	tgagcagatc	cgaccgctgg	ataatgctta	taccgatatt	ttgaacaaag	5932
ccgttaagat	acgtagcacc	agagccaacc	aactggcgga	actggcccat	cagcgcaccc	5992
gcctgggtgg	gatgttcatg	attggcgcg	ttgtgcttgc	cctggtcatg	acgctgataa	6052
catttatggt	gctacgtcgg	atcgtcattc	gtccactgca	acatgccgca	caacggattg	6112
aaaaaatcgc	cagtggcgat	ctgacgatga	atgatgaacc	ggcgggtcgt	aatgaaatcg	6172
gtcgcttaag	tcgtcattta	cagcaaattgc	agcattcact	ggggatgaca	gtagggactg	6232
ttcgacaggg	cgcggaagag	atttatcgtg	gcaccagcga	aatttcagct	ggcaatgcgg	6292
acctgtcatc	tcgcaccgaa	gaacaagcgg	cggctatcga	acaaactgcc	gccagcatgg	6352
agcaactcac	tcgcacggtg	aaacagaatg	cggataacgc	gcacatgcc	agcaaaactgg	6412
cgcaagaggc	ttctattaaa	gccagcgatg	gcgggcagac	ggtttcgggt	gtagtaaaaa	6472
cgatgggcgc	tatctccacg	agttcgaaga	aaattttctga	gatcaccgcc	gtcatcaaca	6532
gtattgcttt	ccagacgaat	attctggcac	tgaatgctgc	cgttgaagcc	gcgcgagcgg	6592
gtgagcaagg	gcgtggattt	gccgttgtcg	ccagcgaagt	acggacactc	gcaagtcgca	6652
gcgctcaggc	ggcgaaagag	attgaaggct	tgatcagtga	atcagtcagg	ttaattgacc	6712
tggggtcgga	tgaggtggca	acggccggga	aaaccatgag	cactattggt	gatgccgtcg	6772
cgagtgtcac	acatatcatg	caggaaatcg	ccgccgcctc	ggatgaacaa	agtagaggca	6832
taacgcaggt	tagccaggcg	atttctgaaa	tggataaggt	gacgcaacag	aatgcttctc	6892

tggtagaaga	ggcctcagcg	gcggcgggtgt	cccttgaaga	acaggcggca	cgattaactg	6952
aggcgggtgga	tgtattccgt	ctgcacaaac	attctgtgtc	ggcagaacct	cgcgggagcgg	7012
gtgaaccagt	tagtttcgct	acggtgtgaa	aatgttcaag	gagggatcga	cagatccctt	7072
cacctttcag	aacggcattg	attttcgaat	agcgttaatc	atcaactggc	aaccagaaga	7132
gaacgtcgca	tctacgcggg	tcagtattcc	aatcggttcg	cctgcaccat	gtcccggaac	7192
aggcagggcc	accagcgtgg	catgacgcag	gtcgtctttt	acagcgccag	aagggacaaa	7252
ccacacgtaa	tcgtattcaa	ccgtaagttg	acgagatagc	gaagcagaca	gcgtttcgat	7312
acaacccgaa	ggaattttac	agccctggct	ctgcactaat	gcctctgaat	gctggcggtg	7372
cgcagtgcct	tctggtgata	caacgacccg	ccattccagc	accgggctta	gcgttacggt	7432
ctcctgaagt	agcgggtgat	tagggcggac	aaccagcttc	aacgattcaa	gaaacagcag	7492
ttcgtaatta	agcccgttca	tcagttcagg	atctgacatc	cgaccaatgc	cgatatcgat	7552
ttccccggtt	tttaaaccgg	ccagaatcat	agggttactc	attgtcgcaa	cttgcaaggt	7612
cgtctctttt	tgttgctgat	gaaactgacc	tataaccgaa	ggtaatatcc	ccagtgccgc	7672
agtaggtagt	gcaccaaccc	tgacgacatc	attattaaga	ccttctttac	gatgaagcga	7732
ccgtccggca	gtgttgatgg	cgtcaagaac	tctgactgca	tgcgttaaaa	attgttcgcc	7792
gggtaaggta	agttgcgccc	cctgacgacc	acgctcaaac	aagcgagcgc	cagtcagctg	7852
ctccagttca	ttcaatgtct	tagagagcgc	aggttgactc	aaattaaggg	tttcagccgc	7912
gcgccccaaa	gttccttggt	gtgcgacagc	tacgaatgta	tgaagggtggc	gcaaacggat	7972
gcgctgacta	aacagactat	ttttttccat	aagcgatggt	aaaaacgaag	cggtgtcgct	8032
gacaagtgaa	gttgtttgat	tatgataact	tgattgcaaa	atattattaa	caattaaagc	8092
aattatgtta	cagcaaaatg	gataaatattg	atgttttcgc	ggcgagatca	cagtttgtaa	8152
attcttcccg	caagagtga	tgcggttacc	tacactccag	attactgacc	actggaggca	8212
gacactatgg	cgaacagcat	cacggcggat	gagattcggg	aacagttttc	gcaggcaatg	8272
tcagccatgt	accagcaaga	agttccgcaa	tatggcacgc	tgctggaact	ggtagctgat	8332
gtgaatctgg	ctgtgctgga	aaacaatcct	caactgcacg	aaaaaatggt	aatgcagac	8392
gagctggcgc	gactgaatgt	tgaacgtcat	ggggcgattc	gcgttgggac	tgcacaagag	8452
cttgctactc	ttcggcggat	gtttgccatt	atggggatgt	accgggtgag	ctattacgat	8512
ctctcgcagg	caggggtgcc	ggtacattcg	acagcatttc	ggccatttga	tgatgtttct	8572

ctggcgcgta	atcccttccg	cgtttttacc	tccttactcc	gccttgagct	tatcgagaac	8632
gaaattttgc	gccagaaagc	ggcggagatt	ctgcgtcagc	gcgatatctt	caccccacgt	8692
tgtcgacaac	tgttagagga	atatgagcag	cagggcggtt	ttaacgaaac	acaggcacag	8752
gagtttgtgc	aggaagccct	ggaaacgttt	cgctggcacc	agtcagcaac	ggtagatgaa	8812
gaaacctatc	gcgcatthca	caacgaacat	cggttgattg	ctgatgtggg	ctgttttcct	8872
ggatgccata	tcaaacacct	gacgccacgt	acgctggata	ttgaccgggt	gcagtcgatg	8932
atgcctgaat	gcggaattga	acccaaaatt	ctcatcgagg	ggccgcgcgc	ccgcgaggta	8992
ccgattttac	tacgccagac	cagctttaa	gcactggaag	agacgggtgtt	gtttgcgggg	9052
cagaaacagc	gcacgcatac	cgcgcgcttt	ggtgaaattg	agcagcgtgg	cgtggcatta	9112
acgccgaaag	ggcgacaact	gtatgatgat	cttctgcgta	acgctggaac	cgggcaggat	9172
aatctcactc	accaaattgca	tttacaggaa	accttccgca	cttttcctga	cagtgagttt	9232
ttaatgcgtc	agcaagggtt	ggcatggttc	cggtagcgtc	tgaacgcctt	gggtgaggcg	9292
catcgtcagg	cgattcatcc	tggagacgat	ccacagccct	taattgaacg	tggttgggta	9352
gtggcgcaac	ccatcaccta	tgaagatttc	ttgcccgta	gcgcggcggg	gatcttccag	9412
tcaaattctgg	gtaatgaaac	gcagacacgc	agtcacggta	atgccagtcg	cgaagcattt	9472
gagcaggcgt	tgggttgtcc	ggttttggat	gagttccagc	tttaccagga	agcgggaagaa	9532
cgcagtaaac	gtcgtgtggg	tttgctttaa	aatctgacca	tcgccttttg	caaaaatttg	9592
cctgatttta	caaacgaatc	aggctcatcc	catcgacata	aaaaaaatgc	cgatttatgc	9652
atattctctc	agttcaacaa	ttggattatt	aataaatatt	gtctagagtg	agcggtcata	9712
aataagcact	ttcttgccgc	tgaaaacgac	cagcgcggga	ccattcacia	caccagaagg	9772
actcactttc	aggtatggat	cgtagacgat	ttattaaagg	ttcaatggct	atggccgcgc	9832
tgtgcggtac	cagcggcatt	gcttctcttt	tttctcaggc	ggcattcgcg	gcagattctg	9892
atattgccga	cgggcaaacc	cagcgttttg	acttctccat	tctacagtca	atggcgcacg	9952
acttagcgca	aacagcgtgg	cgtggtgcgc	ctcgtccgtt	acctgacacg	ctggcgacaa	10012
tgacgcgcga	ggcttataac	agtattcaat	acgacgccga	aaaatcgctc	tggcataacg	10072
ttgagaaccg	tcaactggac	gtcagttct	tccatatggg	aatgggattc	cgtcgcgcgc	10132
ttcgtatgtt	ttctgtagat	ccagcaacac	atctggcgcg	tgaaattcac	tttcgcccgc	10192
agttgttcaa	atacaacgat	gcagggtgtg	atacaaaaca	attagaaggg	caaagcgatc	10252
tcggctttgc	cggttttcgc	gtgtttaaag	ccccgaact	ggcgcgcgct	gatgtagtat	10312

catttctcgg cgcgagttat ttccgcgccg ttgatgatac atatcaatac ggtttgtcgg 10372
 cccgcggcct ggcgatcgac acttacaccg acagtaaaga agagttcccc gactttaccg 10432
 ccttctggtt tgatacggta aaaccggggg caactacctt taccgtttat gcgttgctcg 10492
 atagcgccag cactactggt gcctataagt tcactatcca ttgtgagaaa agtcaggtga 10552
 ttatggatgt ggaaaatcac ctgtatgcmc gcaaagacat taaacagctg ggcattgcmc 10612
 cgatgaccag tatgttcagc tgcggtacta atgaacgctg gatgtgcgat acaattcatc 10672
 cgcaaattca tgactctgat cgtctgtcca tgtggcgggg caacggcgag tggatttgcc 10732
 gtccgctgaa taatccgcaa aaattgcagt tcaatgctta caccgacaac aaccggaaag 10792
 ggtttggttt attgcaactg gatcgtgact tctcccatta tcaggacatt atgggctggt 10852
 ataacaaacg cccaagtctg tgggtggaac cgcgtaacaa gtggggtaag ggcaccatcg 10912
 gcctgatgga aatcccaaca acgggcgaaa cgtgggataa cattgtctgc ttctggcagc 10972
 cagaaaaagc tgtaaaagca ggtgatgagt ttgcattcca gtatcgtctg tactggagtg 11032
 cgcaaccgcc tgttcattgc ccattagcmc gcgttatggc gacgcgtacc ggcattggcg 11092
 gtttctcgga aggttggggc ccaggatgaac actatccga aaaatgggcg cgtcgttttg 11152
 ccgtcgattt cgttggtggt gatctgaaag ctgccgcgcc aaaaggcatt gagccggtga 11212
 ttacgctttc cagtggggaa gcgaagcaaa tcgaaattct ctatattgaa cccatcgatg 11272
 gttatcgatc tcagtttgac tggatccga cttcggactc cactgatccg gtcgatatgc 11332
 ggatgtatct acgttgtcag ggggacgcta tcagtgaac atggctgtat cagtatttcc 11392
 cgccagcgcc ggataaacgt cagtatgttg acgaccgct gatgagttaa tcgttttttc 11452
 ttcggcacct tcttcgggag gtgccgtctg gttaaacacg atcccgctcg catttttccc 11512
 taagttaaat gagtaatctg atgggtgtgta tttcagatac accttgtcag ccaactaacg 11572
 ggagtgcgta tgtttccaga ataccgagat ttaatatccc gtctgaaaaa cgaaaatc 11630

<210> 9

<211> 479

<212> PRT

<213> *Escherichia coli*

<400> 9

Met	Ser	Val	Pro	Val	Gln	His	Pro	Met	Tyr	Ile	Asp	Gly	Gln	Phe	Val
1				5					10					15	

Thr	Trp	Arg	Gly	Asp	Ala	Trp	Ile	Asp	Val	Val	Asn	Pro	Ala	Thr	Glu
			20				25						30		

Ala	Val	Ile	Ser	Arg	Ile	Pro	Asp	Gly	Gln	Ala	Glu	Asp	Ala	Arg	Lys
		35					40					45			
Ala	Ile	Asp	Ala	Ala	Glu	Arg	Ala	Gln	Pro	Glu	Trp	Glu	Ala	Leu	Pro
	50					55					60				
Ala	Ile	Glu	Arg	Ala	Ser	Trp	Leu	Arg	Lys	Ile	Ser	Ala	Gly	Ile	Arg
65					70					75					80
Glu	Arg	Ala	Ser	Glu	Ile	Ser	Ala	Leu	Ile	Val	Glu	Glu	Gly	Gly	Lys
				85					90					95	
Ile	Gln	Gln	Leu	Ala	Glu	Val	Glu	Val	Ala	Phe	Thr	Ala	Asp	Tyr	Ile
			100				105						110		
Asp	Tyr	Met	Ala	Glu	Trp	Ala	Arg	Arg	Tyr	Glu	Gly	Glu	Ile	Ile	Gln
		115					120					125			
Ser	Asp	Arg	Pro	Gly	Glu	Asn	Ile	Leu	Leu	Phe	Lys	Arg	Ala	Leu	Gly
	130					135					140				
Val	Thr	Thr	Gly	Ile	Leu	Pro	Trp	Asn	Phe	Pro	Phe	Phe	Leu	Ile	Ala
145				150					155						160
Arg	Lys	Met	Ala	Pro	Ala	Leu	Leu	Thr	Gly	Asn	Thr	Ile	Val	Ile	Lys
				165					170					175	
Pro	Ser	Glu	Phe	Thr	Pro	Asn	Asn	Ala	Ile	Ala	Phe	Ala	Lys	Ile	Val
			180					185					190		
Asp	Glu	Ile	Gly	Leu	Pro	Arg	Gly	Val	Phe	Asn	Leu	Val	Leu	Gly	Arg
		195					200					205			
Gly	Glu	Thr	Val	Gly	Gln	Glu	Leu	Ala	Gly	Asn	Pro	Lys	Val	Ala	Met
	210				215						220				
Val	Ser	Met	Thr	Gly	Ser	Val	Ser	Ala	Gly	Glu	Lys	Ile	Met	Ala	Thr
225				230					235						240
Ala	Ala	Lys	Asn	Ile	Thr	Lys	Val	Cys	Leu	Glu	Leu	Gly	Gly	Lys	Ala
			245					250						255	
Pro	Ala	Ile	Val	Met	Asp	Asp	Ala	Asp	Leu	Glu	Leu	Ala	Val	Lys	Ala
			260				265						270		
Ile	Val	Asp	Ser	Arg	Val	Ile	Asn	Ser	Gly	Gln	Val	Cys	Asn	Cys	Ala
		275					280					285			
Glu	Arg	Val	Tyr	Val	Gln	Lys	Gly	Ile	Tyr	Asp	Gln	Phe	Val	Asn	Arg
	290				295						300				
Leu	Gly	Glu	Ala	Met	Gln	Ala	Val	Gln	Phe	Gly	Asn	Pro	Ala	Glu	Arg
305					310					315					320
Asn	Asp	Ile	Ala	Met	Gly	Pro	Leu	Ile	Asn	Ala	Ala	Ala	Leu	Glu	Arg
			325					330						335	

Val Glu Gln Lys Val Ala Arg Ala Val Glu Glu Gly Ala Arg Val Ala
340 345 350

Phe Gly Gly Lys Ala Val Glu Gly Lys Gly Tyr Tyr Tyr Pro Pro Thr
355 360 365

Leu Leu Leu Asp Val Arg Gln Glu Met Ser Ile Met His Glu Glu Thr
370 375 380

Phe Gly Pro Val Leu Pro Val Val Ala Phe Asp Thr Leu Glu Asp Ala
385 390 395 400

Ile Ser Met Ala Asn Asp Ser Asp Tyr Gly Leu Thr Ser Ser Ile Tyr
405 410 415

Thr Gln Asn Leu Asn Val Ala Met Lys Ala Ile Lys Gly Leu Lys Phe
420 425 430

Gly Glu Thr Tyr Ile Asn Arg Glu Asn Phe Glu Ala Met Gln Gly Phe
435 440 445

His Ala Gly Trp Arg Lys Ser Gly Ile Gly Gly Ala Asp Gly Lys His
450 455 460

Gly Leu His Glu Tyr Leu Gln Thr Gln Val Val Tyr Leu Gln Ser
465 470 475

<210> 10

<211> 12677

<212> DNA

<213> Escherichia coli

<400> 10

gtcatttgct cctttaatca gctgtcgcgt tcccctgccc tataaaagga gggatatgcac 60
cacgatgggt cattacccaa taagattgaa agtcaccac tttgttgaaa ttgacagcaa 120
acaaacaaaa aaatgcattt cacccttga catcaccatg cactgccatt aatatgcgcc 180
ccgttcacac gattcctctg tagttcagtc ggtagaacgg cggactgtta atccgtatgt 240
cactgggttcg agtcagtcgaggagccaa attcaaaaaa gcctgctttc tagcaggcctt 300
tttgctttct aattaccaac gctcttaaaa catctgtctt gaaccagaac taatttgac 360
aggcattccc gatcgacgtt gcaacgcagc atttgcgca ttacatcaa cttcttgccc 420
gttgataaac gccgcgaaag atgggggttac cggcaatggc acttttcggt cagactcata 480
ttctgcacga ttgcgcgaca atgggtcatg aacttcagc cagttcgagc catctgggtc 540
agtgggtgat ttactggct ggtcgataat ttgcacagc gtccaacag gaacattatc 600
aaacagatat ttgatatcgt cattgcgcag acgaatacag ccctgactta cccggagccc 660

aataccaaaa	ttggcattgg	taccatggat	ggcatacaac	ctgccaatat	aaatcgcgta	720
cagcccccattg	ggattatcgg	ggcccgcagg	aacaaatgcg	ggcaaactct	cccctcgttt	780
cgcataattcg	cgcgcagtggt	tgggcgttgg	cgtccagggt	ggagcttctt	gtttacgttc	840
aacggtagtc	accaggttac	gcgggggtttc	tgcgccagcc	tggccgatac	caataggaaa	900
gactttccaca	gtattactgt	ctggtgggta	gtaataaaga	cgcattctcag	cgacgttaac	960
aacaatccct	ttacgaacag	tgtcggggcaa	aatcagttgc	tgcggaatgg	tgagttgcga	1020
gccagacttc	ggcaaaaaaa	catcagcgcc	cgggttcgct	tccagcatgt	tacttaaccc	1080
ttgcccgtat	tgtgcggcaa	aagtctocag	cggctgggta	ttgtgatcag	gaacagttac	1140
agtaaacgac	tgccccacta	aacgggtacc	ctctggaggt	aatggataag	ttaccgccag	1200
gctagtatgg	ctggcaaaaa	gcagagcaaa	tgagcaaaga	atatttacac	gacgcatcat	1260
gtccctttcc	tatgtcgcga	aagctatcgg	ttaagtatag	cttttatcag	acttttcggt	1320
tttaactggt	caaatacagaa	gtcgtattcc	cgggtagaac	aatattactg	gcagcaagtt	1380
cgcccatggt	gttgatatatc	gcacaggcag	cttcgatgat	gggcacgcgc	agagctgcgc	1440
cactccccctc	acctaaacgc	atctccatat	tgagataagg	ctccagcccc	aaatgcgaga	1500
gcgctatacg	cgcgcctttt	tctgccgaca	ggtgagaagg	aatgagatac	ggtttgatcg	1560
caggagacat	ctggcagggt	gcgagcgcag	cagcataaga	aagaaatcca	tccagcaaca	1620
cgggtaaacc	gcaggaagca	gcacctaaaca	tactccagc	tattccgacc	aaatcaaatac	1680
caccactttt	tgccaggaca	tcaacaccat	cctgaggatt	tggttgattc	aacgtaatcg	1740
cccgcgcac	aacatcaatt	ttattagcca	gtttatctgt	cggcagggtt	gcgccaatcc	1800
caaccacttc	ctcaggatcc	cggccagtga	ttgtgctgac	tattgctgct	gccggtgtcg	1860
tgtttgccat	cccagttca	cctacaccaa	acagcgtgac	accgtttttt	gccagctcct	1920
gcgtataaca	tatgacgtcc	aaaagcaact	tttcagcctg	acggcgactc	attgccggag	1980
ctgaagcaat	attgccgcta	cctcgtgcga	cacgcatggt	gataagcccg	gggatagggt	2040
cagcagtatc	aataccaaca	tcaattacgt	ggacgttagc	gcccgccttgt	tctgccagca	2100
cacacacgcc	ggttgttcca	cgggtcatat	tttcagcctg	tatggctgtc	acttcttttg	2160
gagaaatagc	gaccccttcc	tcccagacgc	cgtgatcggc	acacataacc	agtaccgctt	2220
ttttgccac	atgcggtatg	ccattcaacc	cggcattcc	tgccagttgt	atggcaagca	2280
cctccagctt	tcccaggcta	ccaacagggt	tgagtaaccc	gtcaatatgc	cgttgtgcac	2340
gcgacatagc	ggtagaatcg	atggctggga	tcgtaattcag	taaatcgga	agtatttgca	2400

tctcacgtct ctttatagca gtgccagcag gaagaccagt tcaccaagct ctatggctgc 2460
 tcccagcgta tcgcccgttt gcccgcccag cgtagctttg agaagctgac cgaggatgaa 2520
 aatcgccacc atcgtcacca ccatagcagc cacaccatgc ataccgggca ataatacggc 2580
 agcaaaaata gcggtctaagc cgagtgtgac gcaggtttgt cgcccatcaa ttttgccaat 2640
 gaacacattg ccaagccctt cttcccgcg c ataacgatga cgatacatca ataatgcggc 2700
 agtcccgcg cgtagccgac atgctgccgc cagcgatgca aggatcgatt cgccacgcag 2760
 agccaactcg cttaacacca gaatctttgc cagtaccaca aaaatcaatg ccagaccggc 2820
 gtgggtgcct aaacggctat cacgcatgat ttccaacatg cgatcgcggc tacgtgcaga 2880
 aaatacgcca tcacaggtat cagcgaggcc gtccagatgg aatccccgg tcatacgcac 2940
 cagcacaagt acgctaaaca gtgccgccag tgggtgcgcca cccatgcct gcagcaccat 3000
 gaagaccagc ccgctaatac cgccaagcaa taatccaatc aaaggaaaag taataatacc 3060
 gcgagaataa tgctcgaaat ccagtccttg ggaccagcga cgcggtacag gcagacgcgt 3120
 aataaatgag agcatcgccc aaaataattt actcatttga tttttactcc aataccggaa 3180
 accaccagcc atacttcatt tgccgcagcg gccaaactgct gatttaccgg cccggcaata 3240
 tcacgaaaat gtcgtgccag acgactctcc ggcaaatcc ccattcccac ttcgttagtc 3300
 actaatacaa cctttgcggg gcaacgttgg caggcagcaa tcaacgactg aatctcagca 3360
 ttaatgcct gttccatcgc ctgataatcc cattcatcag ggtctttatc gccgccataa 3420
 tcaaacaaca gattagtcac cattgtggta acgcattcaa gcaacacaac ctcatcggg 3480
 ttaatgtctg catgaattaa ttcataaga tgttgccagc gctccactgt gcgccagtgc 3540
 tccgggcggc cttgccgatg atgttctatc cgtgcagcca tctcatcatc aaggatttgc 3600
 gaggtagcga tatacagaac ctgtgaagag tccccataa gcgcctctgc gtggcgactc 3660
 ttcccgtcc gtgcgcccc cgtcaccaa atcatcatac cgactcctga ttcaaagtga 3720
 tgatggtatt cattgaacag aacaatggat cccccaccgt tgctgaccgc aaaacattta 3780
 cgcgattaat actgcgcgta atataattaa aaatccagca ttctcaatcc attacgaaat 3840
 aagatggcat tacggaatag ccagactttc tcgtgttaac gtccgacaaa atgcgtcatt 3900
 gacagcggtt tctgtggatt gacacatttc attcagataa tgaattaatg ctactgccgg 3960
 aacaaccagc aaacgggcat tgtgttctga aatccaggct attgattcaa cgtcagcgac 4020
 agatctgcgc tgtaaaagaa cttgtaaaac aacgtaatag aattatccgg aatggtggcg 4080

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

actatgcact	aggggaaggtg	cgaataagtg	gggaaattct	tctcggtga	ctcagtcatt	4140
tcattttcttc	atgtttgagc	cgattttttc	tcccgtaaat	gccttgaatc	agcctattta	4200
gaccgtttct	tcgccattta	aggcgttatc	cccagttttt	agtgagatct	ctcccactga	4260
cgtatcattt	ggtcgcgccg	aaacagggtg	gccagcgtga	ataacatcgc	cagttgggtta	4320
tcgtttttca	gcaacccctt	gtatctggct	ttcacgaagc	cgaactgtcg	cttgatgatg	4380
cgaaatgggt	gtccacacct	ggcccggatg	ctggctttca	tgtattcgat	gttgatggcc	4440
gttttgttct	tgcgtggatg	ctgtttcaag	gttcttacct	tgccggggcg	ctcggcgatc	4500
agccagtcca	catccacctc	ggccagctcc	tcgcgctgtg	gcgcccttg	gtagccggca	4560
tcggctgaga	caaattgctc	ctctccatgc	agcagattac	ccagctgatt	gaggtcatgc	4620
tcgttgggcg	cggtggtgac	taggctgtgg	gtcaggccgc	tcttggcatc	gacaccaatg	4680
tgggccttca	tgccaaagtg	ccactgattg	cctttcttgg	tctgatgcat	ctccggatcg	4740
cgttgctgct	ctttgttctt	ggtcgagctg	ggtgcctcaa	tgatggtggc	atcgaccaag	4800
gtgccttgag	tcatcatgac	gcctgcttcg	gccagccagc	gattgatggg	cttgaacaat	4860
tggcggggcca	gttgatgctg	ctccagcagg	tggcggaaat	tcatgatggg	ggtgcggtcc	4920
ggcaaggcgc	tatccaggga	taaccgggca	aacagacgca	tggaggcgat	ttcgtacaga	4980
gcattcttcca	tcgcgccatc	gctcagggtg	taccaatgct	gcatgcagtg	aatgcgtagc	5040
atggttttcca	gcggataaag	tcgccggcca	ttaccagcct	tggggtaaaa	cggctcgatg	5100
acttccacca	tgttttgcca	tggcagaatc	tgtcccatgc	gggacaagaa	aatctctttt	5160
ctgggtctgac	ggcgcttact	gctgaattca	ctgtcggcga	aggtaagttg	atgactcatg	5220
atgaaccctg	ttccatggct	ccagatgaca	aacatgatct	catatcaggg	acttgttcgc	5280
acottcccta	gaacaccaca	atttcgctct	ctcggtaagg	cactgtcaca	gcattcaaca	5340
gaatgtgact	tgccagattt	attagcgcca	ccagatgttt	aaccgggtaa	ccacgaccca	5400
gtcgggggata	tattccatct	tctcgtgac	atcatcaaga	ataaaaaggt	ttatcacact	5460
cagagcaacg	ttcttcagca	ggcgggataa	ttcttcaaca	tttagaagat	gtgttattaa	5520
aggcatacaa	actggacgta	ttgtattttc	ttttggtggg	tgacctaaagg	tagcagttta	5580
tcctgatgcg	ctgagatttc	tgtaatatct	acgtcaacat	tctcctcgaa	tagaaaatgc	5640
agccccggga	agtgattcac	attttttaac	aaaacgttgt	tagcgtgcc	ttttcagaag	5700
ctctccaaga	aagcgaattc	ttttctcaaa	ttctgcattc	tcagacacag	ctttctactc	5760
catggtaatg	gcccaaatac	gaagttgctc	aggatcatta	gtgggtgctga	gaagttaa	5820

19

gcgcgatgac	cggtaaaacac	gtttggcatt	gacgcaggc	ataccatcaa	gttctgcctg	7560
tctgcgaagc	agcgcccata	cccgacgata	accatacgtt	ggcagctctc	cgataacatg	7620
gtgtatacgg	agaagcacat	ccgtatcadc	agtgtgacga	ctgcggcggc	catccatcca	7680
gtcatcggtt	cgtctgagaa	tgacgtgcaa	ctgcgcacgc	gacacccgga	gacaacggct	7740
gactaagctt	actccccatc	cccgggcaat	aagggcgcg	gcgctatcca	cttttttgcc	7800
cgtccatatt	caacggcttc	tttgaggagt	tcattttcca	tcgttttctt	gccgagcagg	7860
cgctggagtt	ctttaatctg	cttcatggcg	gcagcaagtt	cagaggcagg	aacaacctgt	7920
tctccggcgg	cgacagcagt	aagacttct	tcctgggtatt	gcttacgcca	gagaaataac	7980
tggctggctg	ctacaccatg	ttgcggggca	acgaaggaga	ccgtcatccc	cggttcaaag	8040
ctctgctgaa	caattgcgat	cttttcctgt	gtgggtacgc	gtctgcgttt	ctccggccct	8100
aagacatcaa	tcatctgttc	tccaatgact	agtctaaaaa	ctagtattaa	gactatcact	8160
tatttaagtg	atattggttg	tctggagatt	cagggggcca	gtctagtggc	gaagcatcct	8220
cccggtgttt	aattctcatt	gatggtcagg	aggtaactta	tcagcgcgcc	ggagataatt	8280
atgggtgtgg	actgttgata	gatgagtcctg	cgctggagcg	tgttgaggta	gtgaaaggtc	8340
catattccgt	actgtacgg	tcacaggcaa	ttggcggtat	tgttaacttc	atcaccaaaa	8400
aggggtgaatc	tccggactcc	ctatatcact	taaattgata	caacttttta	gagtagtcat	8460
tagtgaacag	ataattgata	actcagaacc	agtaaaatgc	aaaagacgca	ccacgctggg	8520
aaaatcgctg	ctattcagca	gagttttgta	tcgagaatgg	tggccagcca	cttattgctc	8580
tcgcgtaagc	gggtaccgtg	acattctgcc	tgaacttgac	ctgggtactgt	ggctgattaa	8640
agccgatgac	cgtgccctgt	ctgtggatga	gtatttctgg	cgacacatcc	tgcagtgcgg	8700
acatcagcag	gtgctgtttg	tggtgacgca	ggccgacaaa	acggagccct	gccatgaatg	8760
ggatatggcc	ggtattcagc	cttctcctgc	acaggcacag	aatattcgcg	aaaaaacgga	8820
ggcggtattc	cgtctgttcc	ggcccgta	tcgggttg	gccgtatcgg	ccgcgaccgg	8880
ctgggaactg	gatacgctgg	tcagtgcgct	catgacagcg	cttcccgacc	atgccgccag	8940
tcccctgatg	acccgactgc	aggacgagct	gcgcacggaa	tctgtccgg	ctcaggcccc	9000
tgaacagttt	accggtgcgg	tggacgggat	atttgacacg	gcggagagcg	tctgtattgc	9060
ctctgttgca	cgcacggttc	tgcgtgccgt	ccgtgacacg	gtggctctctg	ttgcccgctgc	9120
ggtatggaac	tggattttct	tctgaacctg	tcgtgactga	tgcctccct	gactctgagt	9180
ctgctcacia	aagcactgtt	ttcgttactg	tctctcttgt	ccgtgcaata	gtcgaataat	9240

agaataaaaac	gatcaatatc	tattttatc	g atcgtttata	tcgatcgata	agctaataat	9300
aacctttgtc	agtaacatgc	acagatacgt	acagaaagac	attcagggaa	caacagaacc	9360
acaattcaga	aactcccaca	gccggacctc	cggcactgta	accctttacc	tgccgggtatc	9420
cacgtttgtg	ggtaccgggt	tttttattca	ccctcaatct	aaggaaaagc	tgatgaaacg	9480
acatctgaat	acctgctaca	ggctgggtatg	gaatcacatg	acggggcgctt	tcgtgggttgc	9540
ctccgaactg	gcccgcgcac	ggggtaaacg	tggcgggtgtg	gcgggttgca	tgtctcttgc	9600
cgcagtcacg	tcactcccgg	tgctgggtgc	tgacatcggt	gtgcacccgg	gagaaaccgt	9660
gaacggcgga	acactggcaa	atcatgacaa	ccagattgtc	ttcgggtacga	ccaacggaat	9720
gaccatcagt	accgggctgg	agtatgggcc	ggataacgag	gccaataaccg	gcggggcaatg	9780
ggtacaggat	ggcgggaacag	ccaacaaaac	gactgtcacc	agtgggtggtc	ttcagagagt	9840
gaaccccggt	ggaagtgtct	cagacacggt	tatcagtgcc	ggaggcggac	agagccttca	9900
gggacgggct	gtgaacacca	cgctgaatgg	tggcgaacag	tggtatgcag	agggggcgat	9960
agccacagga	accgtcatta	atgataaggg	ctggcaggtc	gtcaagcccg	gtacagtggc	10020
aacggatacc	gttggttaata	ccggggcgga	agggggaccg	gatgcagaaa	acggtgatac	10080
cgggcagttt	gttcgcgggg	atgccgtacg	cacaaccatc	aataaaaaacg	gtcgccagat	10140
tgtgagagct	gaaggaacgg	caaataccac	tgtggtttat	gccggcgggc	accagactgt	10200
acatggtcac	gcactggata	ccacgctgaa	tgggggatac	cagtatgtgc	acaacggcgg	10260
tacagcgtct	gacactggtg	tgaacagtga	cggctggcag	attgtcaaaa	acgggggtgt	10320
ggccgggaat	accaccgtta	atcagaaggg	cagactgcag	gtggacgccg	gtggtacagc	10380
cacgaatgtc	accctgaagc	agggcgggcg	actggttacc	agtacggctg	caaccgttac	10440
cggcataaac	cgcttgggag	cattctctgt	tgtggagggt	aaagctgata	atgtcgtact	10500
ggaaaatggc	ggacgcctgg	atgtgctgac	cggacacaca	gccactaata	cccgcgtgga	10560
tgatggcgga	acgctggatg	tccgcaacgg	tggcaccgcc	accaccgtat	ccatgggaaa	10620
tggcggtgta	ctgctggccg	attccggtgc	cgctgtcagt	ggtacccgga	gcgacggaaa	10680
ggcattcagt	atcggaggcg	gtcaggcgga	tgccctgatg	ctggaaaaag	gcagttcatt	10740
cacgctgaac	gccggtgata	cggccacgga	taccacggta	aatggcggac	tgttcaccgc	10800
caggggcggc	acactggcgg	gcaccaccac	gctgaataac	ggcgccatac	ttaccctttc	10860
cgggaagacg	gtgaacaacg	ataccctgac	catccgtgaa	ggcgatgcac	tcctgcaggg	10920

acgccacatt cgctggc

12677

<210> 11

<211> 181

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 3153-3698 of seq id 10

<400> 11

Met	Met	Ile	Leu	Val	Thr	Gly	Gly	Ala	Arg	Ser	Gly	Lys	Ser	Arg	His
1				5					10					15	

Ala	Glu	Ala	Leu	Ile	Gly	Asp	Ser	Ser	Gln	Val	Leu	Tyr	Ile	Ala	Thr
			20					25					30		

Ser	Gln	Ile	Leu	Asp	Asp	Glu	Met	Ala	Ala	Arg	Ile	Glu	His	His	Arg
		35					40					45			

Gln	Gly	Arg	Pro	Glu	His	Trp	Arg	Thr	Val	Glu	Arg	Trp	Gln	His	Leu
	50					55					60				

Asp	Glu	Leu	Ile	His	Ala	Asp	Ile	Asn	Pro	Asn	Glu	Val	Val	Leu	Leu
65					70					75					80

Glu	Cys	Val	Thr	Thr	Met	Val	Thr	Asn	Leu	Leu	Phe	Asp	Tyr	Gly	Gly
				85					90					95	

Asp	Lys	Asp	Pro	Asp	Glu	Trp	Asp	Tyr	Gln	Ala	Met	Glu	Gln	Ala	Ile
			100					105					110		

Asn	Ala	Glu	Ile	Gln	Ser	Leu	Ile	Ala	Ala	Cys	Gln	Arg	Cys	Pro	Ala
		115					120					125			

Lys	Val	Val	Leu	Val	Thr	Asn	Glu	Val	Gly	Met	Gly	Ile	Val	Pro	Glu
	130					135					140				

Ser	Arg	Leu	Ala	Arg	His	Phe	Arg	Asp	Ile	Ala	Gly	Arg	Val	Asn	Gln
145					150					155					160

Gln	Leu	Ala	Ala	Ala	Ala	Asn	Glu	Val	Trp	Leu	Val	Val	Ser	Gly	Ile
			165						170					175	

Gly	Val	Lys	Ile	Lys
			180	

<210> 12

<211> 12790

<212> DNA

<213> Escherichia coli

<400> 12

tcactataga tattgatcat taagttgatt agacccaaaa tcatgattag acctatcatt 60

taaatgatta atagattgca tggagatact gaatgaagcg tgaagaaatc gctgatctga 120
 tggcggtttgt cgtcgttgca gaggagcgta gcttcaactcg tgcagcagcc cgcctgagca 180
 tggcgcgatc agctttaagc cagatagtgc gtcgtataga agaacgattg ggattgcggc 240
 ttctgacgcg aaccacgcgc agcgttggtc caactgaagc gggcgagcat cttttgtctg 300
 ttcttggtccc tatgttgcat gacatagatt cagccatggc atccctgagc gatctgcaga 360
 accgcccac cgggacaata cgtattacta ctgtagaaca tgcagcaaaa acgatattgt 420
 taccagcaat gcgcacattc ctgaaatcgc atcctgaaat tgatattcag ctcaccattg 480
 attatggttt gaccgatgtc gtttctgaac gttttgatgc aggcgtccgt ctgggtgggg 540
 agatggataa agatatgatc gccattcgaa tcgggcccaga tataccaatg gctattgttg 600
 gctcaccgga ttatTTTTCT cgccgaagtg ttccaacgtc agtgtcacia ttaatagatc 660
 atcaggcaat taatttgtat cttcccatc cgggtacagc aaatcgctgg agattaatac 720
 ggggtggacg tgaagttcgt gttcgcattg aaggtcagct tttactgaat acgatagacc 780
 tgatcattga tgctgcaatt gatgggcatt gattggcgta tctacottat gatcagggtg 840
 agcgggctat taaagaaaaa aaactgatac gtgttttga taaattcaca ccagatttac 900
 ccggttatca cctgtactat ccacaccgtc gacatgctgg ctcggcattc tcattattta 960
 tagataggct gaagtataaa ggtgctgttt agcactactt gctgatacat taatttaatt 1020
 cttctcttaa cgtattctca gttcctttca acgttttggc cattttttat tcttcgtaca 1080
 atggcgacag atgctgatta tgataccgaa aacgggtttg aacgtgcgaa gcccgaaactg 1140
 agtgttcgga gttctatgtg ctttaccgca ttttgagac tattatttac actaaatctg 1200
 atttgatata ttgatactta aaacatttga tgcttctttt gtcacttttt tgatggaagt 1260
 tgtttgcatt tctttaagc gaaacaaata attacgcac aattttaatg tcggttagag 1320
 ggaaacttat gaagcactct gtttcagtca cgtgttggtc gctgttggtc agcagcattt 1380
 ctctttcgta tgctgcagaa gttccgagcg gcacagtact ggcagagaag caggagctgg 1440
 tgcgccacat taaagatgag cctgcgtcgc tggatcccgc taaagccgtg ggcctgccag 1500
 agattcaggt cattcgcgat ctgtttgaag gtctggtgaa tcagaacgaa aaaggggaga 1560
 ttgtccccg cgttgcgact cagtggaaaa gtaatgacaa ccgtatctgg acttttacc 1620
 tgccgataa cgcaaatgg gcggatggca caccggtaac ggcgcaagat tttgtctaca 1680
 gctggcaacg tctggtggac ccaaaaacat tgctgccatt tgcattggtt gccgcgctgg 1740

caatactgaa aggcacggtcg aaatagagca taatcccga aaagaagtta ctcagaatat 3540
 ctttaccggc cataccgaca gccagaccac caataccacc aaaggtcagc aagccagaaa 3600
 ggctcatgcc gaaatgttcg ccataaagca gaacaagcac cacaataatg gtgattttga 3660
 tgatacgcga cataatccgc gcactggtga tatcgcgacc ttttttaatc tgctgttttt 3720
 caaactgatt aatcagcaga aatagcttaa tcgtcagaat aaccgcaatc agggacgtac 3780
 agataaaatc gataacgcct ggggtgataa atttgagttt atagttttct ataacataat 3840
 taataatgct accaacagca ctgataatta tgggtgtagat taaaaattgc accgcatgga 3900
 ataaaaatcc ttttctttta cgatttccac ggcgaaacca aaagctcatc agaatcaatg 3960
 ctgcgcagct accgaaaata atgaccagat taagcgcatt atttgtaaac agttcagcga 4020
 tcattgtttt atcaggctcc tccagataat tgtcgtcatg ccggaacccc ctggcggggc 4080
 tattttaccg cgacaattca ttcagatcat caatagtcag ggaaggaagt agcaacatta 4140
 gctaaggaag gtgcgaacaa gtccctgata tgagatcatg tttgtcatct ggagccatag 4200
 aacagggttc atcatgagtc atcaacttac cttcgccgac agtgaattca gcagtaagcg 4260
 ccgtcagacc agaaaagaga ttttcttgtc ccgcatggag cagattctgc catggcaaaa 4320
 catggtggaa gtcacgcagc cgttttacc ccaaggctggt aatggccggc gaccttatcc 4380
 gctggaaacc atgctacgca ttcactgcat gcagcattgg tacaacctga gcgatggcgc 4440
 gatggaagat gctctgtacg aaatcgctc catgcgtctg tttgccgggt tatccctgga 4500
 tagcgccttg ccggaccgca ccaccatcat gaatttccgc cacctgctgg agcagcatca 4560
 actggcccgc caattgttca agaccatcaa tcgctggctg gccgaagcag gcgtcatgat 4620
 gactcaaggc accttggtcg atgccaccat cattgaggca ccagctcga ccaagaacaa 4680
 agagcagcaa cgcgatccgg agatgcatca gaccaagaaa ggcaatcagt ggcacttttg 4740
 catgaaggcc cacattggtg tcgatgcaa gagtggcctg acccacagcc tggtcaccac 4800
 cgcgccaac gagcatgacc tcaatcagct gggtaatctg ctgcatggag aggagcaatt 4860
 tgtctcagcc gatgccggct accaaggggc gccacagcgc gaggagctgg ccgaggtgga 4920
 tgtggactgg ctgatcgccg agcgccccgg caaggtaaga accttgaaac agcatccacg 4980
 caagaacaaa acggccatca acatcgaata catgaaagcc agcatccggg ccagggtgga 5040
 gcacccattt cgcacatca agcgacagtt cggcttcgtg aaagccagat acaaggggtt 5100
 gctgaaaaac gataaccaac tggcgatgtt attcacgctg gccaacctgt ttcgggcgga 5160

agactgtttt	gccgatcggt	ggaggtgagc	gtagcctgaa	tttgtttcgc	aaaagccagt	10380
tottcggagt	tccattccgg	ggtaccaaaa	tgggataggg	cctggtacat	ggcattttct	10440
aaggtgcgat	tcgggagata	actggaacag	gctttgtcga	agcggcattc	aaccgtgggt	10500
tcggtcatca	atgccgcacc	ttcggcgatt	ttggcgaccc	gatcataaat	atgctgcacg	10560
tcggtcattt	cgggggcgcg	gataagataa	agcacttctg	cctgcgccctg	gaccacgttg	10620
ggcgagatcc	cgccgctatt	tgtgatggca	tagtgtaocg	gcgctttttc	aataatatgt	10680
tcgttgagga	agttggtgcc	agtggtcatc	aacgttacgg	catcaagggc	gctgcgtccc	10740
aaatgagggg	aattcgcggc	atgtgctgcg	atccctttaa	agcgccatga	tgcctgaatg	10800
tttgccagcg	tgcgggtatt	gaacataacc	gcaaaggcct	ccgggtgccca	ggtgagtgcc	10860
gcatccacat	catcaaatac	cccctcgcga	accatgaacg	ttttaccgga	gccgccttct	10920
tcgccaggac	aaccataaaa	gcgcaccgtg	ccgccttgcc	catattgttc	cagccatttc	10980
ttgacggcta	ttgcagcggc	aaaggcggcg	gttcccagca	aattgtgtcc	gcaaccgtga	11040
ccattttcac	cgggcgtcac	ggatgtaggt	tgcgcgcaac	ctgcttgctg	acttaaacct	11100
gccagggcgt	catattctcc	cagcagggcg	ataaccggtt	tgccctgacc	aaacgaagca	11160
ataaaggcat	ttgggatatt	gcctacgttg	cgggtaacgg	tgaagcctgc	agattccagc	11220
gccgaagcca	gatgctccgc	tgaccagaac	tcttcaaaac	gtgtttctgg	atgatcccag	11280
atttgatcgg	caatatcggt	ataacgttgg	cgatcggctt	caatcgcatc	gtcgataaaa	11340
cgatagattt	cctgcatcag	atacctcgcg	tccagggaaa	attgagcgcg	gtgcgcgccca	11400
gcgtttcgac	ggcaatagcg	agaacctgct	cgtcaaaatc	gaatttttcg	ttgtgatgac	11460
ctgccgccag	ctgtgtgccca	aacaccacgt	aggaggcttg	cccttgatgt	tgctgcacgc	11520
gggccatcat	taatgtggca	tcttcggaac	ccgcaggcgc	ttcaacacgt	tcaatggcct	11580
gattgacccc	cgcgacctga	gcgcctgac	tttgcaacca	tgcgacccat	tgcggcgaag	11640
gagaactggc	ggtagctgca	cccatcagac	gagtttcaac	gccgacacca	tacatggttg	11700
ctgcgccctg	aatcgcttgt	tgtgcacggg	caaaaacata	ttgattaatg	acgtcgcctg	11760
ccccgcgtgt	ttccactttc	agcaacgccg	aggcaggaac	aacgttacga	ccgcttcctg	11820
cctgcataac	gcccacgttt	actctggaag	ctccttcgct	gtgcggggcg	attgcatgca	11880
gtgcaagagt	ggcttgtgct	gcgcgcaaca	aggcattgtg	accgtcttct	ggttttgcgc	11940
ctgcgtgagc	ggcggtaccg	gtgaagtgcg	cgtcaaattt	ggtggttgcc	ataaaattat	12000

cactgccgca caccacggtg cccgcaggta cgccagtgcc aatgtgcacg gcagtaaaat 12060
 aatcaacatc atctacgaca cctgcatoga ccategcccg cgcgccacgc gtaccttctt 12120
 ctgcaggctg aaaaatcagt ttgatgacgc catgtagtcc ggactcgaac tgtttaaggg 12180
 tatgcccag cccaagccca atggcggtat gtccatcatg accacaggca tgcattc 12240
 cggcggttaca tgacgcaaaa ccgtcgcggt agggcgcatg gctgacatcc tgctcttcac 12300
 tgagatccag cgcgtccata tcgacacgga aagccatcac cggaccgggg cgaccggtat 12360
 ccagggtggc gacgatacca gtgaaaccac cttcaaaagc cgcaatccat tgtgctagcg 12420
 caccctgttg acgagcgcgc tcgaattcgc gttgtagagt gaattcatca ggtaatccca 12480
 tccggctact ttcattaact acttcgcgac ccagcgccag tgaatagccg agctgggtgca 12540
 attcttccgc aacaagggtg gcagtgcgga attccacca gccagactct gcatagtgat 12600
 gaaaatcacg tcgccagtgc gataattttg gggcaagcga attaacaaat tgattcaaag 12660
 actccataac ctttcccgtc atcagtaaaa agtgtgaccc ggttcacgta gcgtagttt 12720
 ttacttatca ctaactgatt tttcacagtt ttaaccgttc ataaattacc ctgacacaat 12780
 catctgcatt 12790

<210> 13

<211> 294

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 3733-4953 of seq id 12

<400> 13

Met	Lys	Arg	Ala	Val	Thr	Gly	Gly	Val	Ser	Ser	Gly	Asn	Asn	Val	Ala
1				5					10					15	

Ser	Arg	Gly	Arg	Ser	Gly	Thr	Ser	Lys	Asp	Ser	Gly	Met	Arg	Ser	His
		20						25					30		

Val	Trp	Gly	Asn	Val	Lys	Asp	Thr	Thr	Gly	Asp	Arg	Lys	Val	Val	Arg
		35					40					45			

Met	Ser	Asp	Ala	Ser	Tyr	Ala	Ser	Met	Ala	Ala	Asp	Ala	Gly	Ser	Ala
	50					55					60				

Tyr	Asn	Asn	Arg	Val	Gly	Ala	Gly	Ser	Gly	Gly	Gly	Ser	Arg	Val	Gly
65					70				75					80	

Ala	Asp	Ala	Met	Arg	Gly	Arg	Gly	Lys	Ala	Val	Gly	Tyr	Val	Val	Thr
			85					90					95		

Lys Ala Met Ala Ser Gly Val Ser Ala Cys Ala Thr Lys His Gly Val

100					105					110						
Asn	Tyr	Ser	Ser	Ser	Ala	Cys	Ala	Thr	Ser	Ala	His	Cys	Gly	Asn	Ala	
115					120					125						
Val	Gly	Lys	Asp	Val	Ala	Gly	Gly	Gly	Cys	Trp	Met	Ala	Cys	Asp	Ala	
130					135					140						
Met	Gly	Ala	Ser	Thr	Lys	Tyr	Asn	Asp	Thr	Lys	Ala	Ser	Arg	Thr	Tyr	
145					150					155					160	
Asp	Ala	His	Arg	Asp	Gly	Val	Ala	Gly	Gly	Gly	Gly	Met	Val	Val	Val	
165					170					175						
His	Ala	Ala	Arg	Gly	Ala	His	Tyr	Ala	Val	Gly	Tyr	Gly	Ala	Thr	Ser	
180					185					190						
Asp	Gly	Ala	Asp	Met	Val	Ala	Ser	Gly	Gly	Ala	Val	Arg	Cys	Met	Lys	
195					200					205						
Met	Ala	Met	His	Gly	Val	Asp	Thr	Asp	Tyr	Asn	Ser	His	Gly	Thr	Ser	
210					215					220						
Thr	Val	Gly	Asp	Val	Lys	Ala	Ala	Arg	Val	Gly	Asp	Lys	Ser	Ala	Ser	
225					230					235					240	
Ala	Thr	Lys	Ala	Met	Thr	Gly	His	Ser	Gly	Ala	Ala	Gly	Val	Ala	Tyr	
245					250					255						
Ser	Met	His	Gly	Ala	Ser	Asn	Asp	Ala	Ala	Gly	Asn	Val	Thr	Thr	Thr	
260					265					270						
Asp	Arg	Thr	Thr	Val	Met	Ser	Asn	Ser	Gly	Gly	Gly	Thr	Asn	Ala	Thr	
275					280					285						
Val	Met	Arg	Lys	Lys	Asp											
290																

<210> 14

<211> 10244

<212> DNA

<213> Escherichia coli

<400> 14

aaaacatccc ttaaaaccaa tctaattcttt ttcttcctct gtgtatttgt tccccatattg 60

gcgtcataat ttacgctacg taatacggga tagttacgat acgcagcgat agcgctaagt 120

tttagttaaa atcccccatc agcgggatat ggggatctct gggaggttca ggttttagca 180

tcgcgacttt aatacgacag acgctggtga cgatgatgcc aagtagtgac tcttccgaat 240

aaggttccca ctgaccaatt ggcgcgcgct tcgcaataaa atctcccttc gcccagtatt 300

gggaaaagta gatacattca aactgtgtac gctgtttcgt ctcacagttc acgacattgc 360

41

aaagcccaac	ctcattggta	atgaaccagc	tccgtgaatg	tccgctctgg	cacagagcga	3840
aattttttga	tctccccct	gaaatctaaa	cttagtcatg	tcacgttttt	gggtttctaa	3900
aattttaact	tgcggttttt	cgttgccgta	agggttatac	agaaatgtcc	gttaagcaga	3960
gttcaaaatt	gattgccgtg	atcacgactg	gtttgaaagc	cgcgcccaag	cctgtacagc	4020
tctggtttgc	gttgattatg	aacctgtcag	cctaaagcaa	gcggatggac	gatgagtatt	4080
ggtaatcttt	cagagtccgg	aaaagttcag	cccagtcctg	aacaggcttg	ctggcgccag	4140
tccagtttca	ttcagtcgtg	gtttggttct	tacggcctgt	gcaatctacc	tcattaggca	4200
catcggcctg	ccagataccg	gctcggggtg	tatttccgct	tccacgctga	atactgttct	4260
cagcaatcct	ggggtcatac	cctctttctg	tgtgccttgc	gccataacat	gtccgtttgc	4320
cattaccacc	agttgatcgc	agtaaccggt	agcctgatta	aggtcgtgca	gcacagcgac	4380
caccgttttc	ccctgagtc	ggagttcgcc	catcaaccgc	atcagggtcca	cctggtgatt	4440
gatatcaaga	taggtgggtg	gctcatcaag	taatacaacg	ggcgtattct	gggccaggac	4500
cattgccaga	aatgcgcgct	ggcgctgacc	gccggaaagc	tcggttaacc	gacgaacggc	4560
aagatgattg	atccgggtct	ggttcatggc	gacattaact	cgtgcattgt	cttcagcgga	4620
gagacgccc	cagagtgaca	gccagggtt	acgaccatac	gaaaccagct	cctggactgt	4680
gatccctct	ggcgttaaat	ggtgctgagg	cagcagcgaa	agcctgcggg	ccaactggcg	4740
cgatgagagc	atatttatgg	gattatcgcc	gagaaatacg	gtgccagact	gcggcattaa	4800
aagccgcgaa	aaacagttta	acagcgtcga	tttcccgcaa	ccgttaggac	cgatcagggc	4860
ggtgatcttc	cccgttggca	gtgagagtga	aacgtcgtta	agtaccttgt	ctgtcccgtg	4920
actgaccgtc	agattttcag	ttcgtaaagt	catttatcgc	attctcacia	gcaaccagac	4980
aaaccacggc	gcaccgataa	tggcggtcag	cacgccaacc	gggagctcca	gtgggggatg	5040
aataattctc	gccagcagat	cggcaaccac	caacagcaac	gcacctgtca	gggccgaaac	5100
aggcagcagt	ctgcggtgac	gtccaccggt	gatgtacgc	atcatatgcg	gcaccacgag	5160
accaataaag	ctaatcgggc	cgcaggcggc	cacgcgggta	gatgtcatgg	cgacagctag	5220
taacaaagcc	cagaatcggg	tatggggcac	cgacacaccg	agcgtggtgg	cgcgcgcatc	5280
gccgagtgca	aggaggtcga	gatcgcggca	aaaactcagg	ctcagcggca	gaaataaaat	5340
catcagcggg	atggcaatct	tcacaaagct	ccagtcacgg	cccataagc	tgccggtcag	5400
ccacagcagg	gcgttggtca	catcctgcgg	gcgcgagagc	atcagataat	ccgtcaggct	5460
ggcccagcat	gcagaaagcg	ccacgccggt	gagcgccagc	ttcatcggt	ggtgggtctt	5520

tgccagcatc	ttcagcaata	tcaacccgcg	catgccgccc	gcaaaggcca	gcagcggcag	5580
caccatcacg	ggcagtga	gcataagaag	tagagccccc	acagaggcca	ggctggcggc	5640
atggttaaca	ccgagaatat	ccggtgatgc	cagagggttg	cgcacaatcc	cctgtatcag	5700
cacgcccgcg	acggcgaggg	ctgcaccgac	aaacagtgcc	agcagcaagc	gcggcagtcg	5760
gtactccatc	aatacataat	aatgctcgtg	tccggcctgc	cagtcgggtca	gcagcgcgcg	5820
ccacggcacg	gggatcactc	ccatatggag	tgataacagc	gcacagcccc	ccagggcaag	5880
ggtgatgaaa	ataaccagcg	caattttcat	cctcgccctcc	tcacaagcca	gacaaagcaa	5940
gggctgcaa	tcagcgccag	cactgcgcct	gcgggcagat	ctccggggaa	ggccagcgcg	6000
cgtgcgagta	catctgccag	cagcatcagc	gtggccccc	gcagcatgct	cactggcagt	6060
acgttgcgct	gatcgaagcc	tgcccagaag	cgcgccagat	gtggcaccag	cagaccgata	6120
aacgccaccg	gacctgctac	gctgacgcac	gcaccaacca	gaagcagcac	taacatattg	6180
atgaccaaac	gtagcctcgt	caggttcact	cccagcgtat	gggcgggtgct	gtcgctgagg	6240
ttgagcaggt	tcagttgatt	cgccagcagc	aacacgacag	ggactgcagt	gaccaccacc	6300
ggcaagagct	gccagacatc	ctgccagcgg	gcgtgggaca	ctccgcctgc	cagccagtaa	6360
aagatgccgt	aagcatgata	ttcggccagc	agcagggtga	tgcgggtaag	gcccatacaa	6420
aaggccgaca	gcgcgatacc	cgcgaggata	agtttgtttc	tgtcatgggt	atgacgaaat	6480
ccgcctcctg	cggtcatgac	cagcagccag	ctcacgcgcg	ccccgcgatgc	cgcgatgaat	6540
gacagagaat	agcctgcaat	cggcgtcgga	ctcagcgcgc	tggtaaagcg	catagccagc	6600
gccgcgccgc	tggttaatgcc	gagcagtgaa	ggagaggcca	ttgggttgtg	ggtcaggggt	6660
tgcagcagcg	tgcccgcgag	cgccaggctt	gcgcgatca	gaacggcgac	caggcttcgt	6720
ggcaaacgaa	ggttttgcac	cagcgcttct	ggtagcgttg	gcgtgtgtcc	aggcagcagg	6780
gcgcgggttg	catctgctcc	ggaaacagga	atggccgagt	agcaaaacag	actcagccag	6840
aaaataataa	taagtgctgc	aacgggaagc	ccccacagca	gcaccgggtg	ttttatcgcg	6900
gtcatttcac	aacggtgaagc	ggctgatgg	ggaagatttt	taccgtgtca	gcggcaatac	6960
gctctgcagc	aaaaataaccg	cgcataccgc	cccagggtgt	actgtcgacc	gaagcaacct	7020
gctgcttctg	cgcggcgggt	aacatctgcc	agagcggata	ttgttgccag	cgtttaacaa	7080
tgctctcttc	gcgatagtgg	gcaaccagca	gccaggcagg	attgaccgcc	agcagttgct	7140
ccaggccgat	ggacggcatg	gacgcacccg	ccatgcgcgc	gggaacgttc	agccccagag	7200

aggccagcac	gctgcgggtc	caggtctcct	gagtatgcag	gttgaattgc	tgttcgcgtg	7260
atgtgccaaa	ggccacgcgt	gtcccttttg	gaagctggct	ggcccactgc	gccatcctct	7320
ctttatgttg	ttccagacgt	gcctgcatct	ctcgcttttt	accaccatt	tcgccgatga	7380
tagccgcaga	ttgcaaattt	tcagcgtagg	tttcgttgcg	ggacttaagc	agcagtaccg	7440
gcgcgatttg	ctgcaaggcg	atgtaaacct	ccgcatggcg	actgctgtcg	gcaatgatca	7500
ggtctggttt	cagagcggca	atggcttcca	ggctcggctg	cgcgcgcggt	ccgacggact	7560
gccacggttt	caggtgcgca	cgcacttcgg	gcaggatgcg	ttttgcatcg	ttatcgtcgg	7620
caataccgat	cgggatgacg	tccacggcgg	ccagcgcata	ggcgaacgag	agttccagca	7680
ccacaatccg	ttgtggcggt	ttttcgagtg	taaacgtgcc	gtgttcgtcc	tgaaccgtgg	7740
cggcaaaggc	gtggctgata	accagcagca	ggcctgcaaa	aagaaaacgg	ataaatgcc	7800
acataatcac	attccagcta	aaagcccggc	aagccggggc	ttaacacata	agaacttcaa	7860
cgacccctgc	atatacagcg	tgcgcggctg	gcctgcatag	atgcctttgt	tgttgctcgc	7920
ataagagcgg	atgaagtagt	cctggctgaa	gatgtttttc	acaccgaatg	ccaggttcag	7980
atctgccata	tgcgggccaa	agtcatacgc	cacgcgtgcg	cccagagca	tgaagccggg	8040
aatgcggccg	gtactgccgt	cggcgctctc	tttcaccgta	ttggcgttat	ccgcaaactg	8100
gctggactgg	aaatcgctgt	tcagattgaa	cgtccagttt	cctggcttgt	agtccacgcc	8160
cagcgtgcct	ttatgtttcg	gggagaatgg	taccagattg	ccgtaggtgt	cgcctttctc	8220
gcggatttcc	gcgttcacat	acgcatagct	ggcgtagatg	gaaacgttat	caagcgttgg	8280
cgttagcgta	cccagatcgt	aacgtgcctg	cgtttccagc	ccggtatggc	gcgttttgcc	8340
acgtgcagtg	acggtgtcgt	tggctcgggt	ggagtcgtac	tgattgttaa	agttaatcag	8400
gaacagcccc	atttcggccg	tcagcgcgcc	gtcgtcgtag	cgggtaccga	gttcccaggt	8460
tcgcgccttt	tccggttcaa	cattgccgct	ttgcacagcc	ttgccaatct	ggctgtactg	8520
tacggtgccg	aacgagcctt	cagtgtttgc	ataaagattc	cagctgtcag	tcaggtgata	8580
gagcacgttc	aacgccggaa	gcggtgcggt	atagctcact	tcttcgtgcg	tgctgtgat	8640
ggcgttgttc	tggtatgact	cgatatgttc	gaaacgcata	cccggcgtga	tgggtccagtt	8700
gccgatgtcg	atthttgtcat	ccagatacca	ggcgtgcgcc	tcggtgccgg	aacgcgtatc	8760
gcggtcgtaa	gggcttgagc	cggacggcaa	ctgcccgcgt	ctggtggcgg	tgtagtaacg	8820
catttcatgc	gttgattcat	tcaaatagcg	atagcccacg	cccacttcgt	gcgcggaagg	8880
gccgatcata	aagatctggc	tgtagcgtgg	ctcaataaccg	cgcacccagt	agttacgcgg	8940

cgagaggggtg atgcgtttgc cttgctccag gtagccgctg cgcaggggtt ggggtgtagaa 9000
 cccctgaatg ttgaatttat gctggctgtc tggctggaac tggtagccca ggctcgccag 9060
 cttgcgacga cccagagaagc ggtcatacgg gcgggtggat tgccagcgat cggcgtcgta 9120
 atccgcgcga gacaggccac cgggcatgtc ggcttcacog tcgtaatat gcagcaggct 9180
 gttgaagggtg tgcacctcat ccggcgcata tttgcttttc agcatcagggt cgtcgatgcg 9240
 ggtggcgctg tgctcgcgcc agtcaactgcc gcgcgtgccg gagtagagca gcgcgggtgcc 9300
 aaaaccgttg tccgctgtgc cgcccacat caggttggtc gtctctttcg ggttgttttg 9360
 tgaagagggtt gggctgagct gaccttcac gcccgctcg ataccaaagt cctgcggaat 9420
 ggcacgggta acaaagttca ccacgcgcc cagcgtctgc ggtccgtaac gcaccgcacc 9480
 accaccgcgt accacgtcaa tggcatccat gttgccgagc gaaacgggag ccagtgaag 9540
 ctgcggctga ccgtaagggg cgaaggggac ggggatgccg tccatcagga cggtcgagcg 9600
 gctggcgagg cgcggttca ggccccgat gccaaagttc atcgccagggt cgtggctgcc 9660
 ggtgccgttg ttttcggcg cgctgacgcc agggatgcgg ttaagtacct cagcatggt 9720
 ggttgccgcc gttttggcga aatcctcac gcggatcacg tcaogcgcg cagcatgttc 9780
 aaatacgtcg ttttcacgc catcacccag ccagtcgccg accacggtea gggcatcttc 9840
 ttttggtgcg ggcgcgggct ccagcgtcca gctgttattt cccagcggtt ttacctgcag 9900
 tccgctgccg tccagcagtt gttgcaggcc gctctgacg tcgtaatcgc cgtgcaggcc 9960
 gttgctctgc ttgccgcgc tcaggctggc gtcaaccgag agggtaaate cgctgtgtgc 10020
 ggcatactga ttgagcgctt tatcgagcga tcccgggtgcg atattaacct gtgcagcaaa 10080
 agcggaaaac gagagaccgg ccagcggcag caggctcagg cgaatggtgt taaccaaagg 10140
 tgttgtttta cgaaaaacgc gtaacggcgt cataccttcc ccatcatcat tttgtttgtg 10200
 ttcagctatg agtcgaacga gaagggtaaa aaggacaatc gaaa 10244

<210> 15

<211> 774

<212> PRT

<213> *Escherichia coli*

<220>

<223> complement of position 7849-10173 of seq id 14

<400> 15

Met	Thr	Pro	Leu	Arg	Val	Phe	Arg	Lys	Thr	Thr	Pro	Leu	Val	Asn	Thr
1				5				10						15	

Ile	Arg	Leu	Ser	Leu	Leu	Pro	Leu	Ala	Gly	Leu	Ser	Phe	Ser	Ala	Phe
			20					25					30		
Ala	Ala	Gln	Val	Asn	Ile	Ala	Pro	Gly	Ser	Leu	Asp	Lys	Ala	Leu	Asn
		35					40					45			
Gln	Tyr	Ala	Ala	His	Ser	Gly	Phe	Thr	Leu	Ser	Val	Asp	Ala	Ser	Leu
	50					55					60				
Thr	Arg	Gly	Lys	Gln	Ser	Asn	Gly	Leu	His	Gly	Asp	Tyr	Asp	Val	Glu
65					70					75					80
Ser	Gly	Leu	Gln	Gln	Leu	Leu	Asp	Gly	Ser	Gly	Leu	Gln	Val	Lys	Pro
				85					90					95	
Leu	Gly	Asn	Asn	Ser	Trp	Thr	Leu	Glu	Pro	Ala	Pro	Ala	Pro	Lys	Glu
			100					105					110		
Asp	Ala	Leu	Thr	Val	Val	Gly	Asp	Trp	Leu	Gly	Asp	Ala	Arg	Glu	Asn
		115					120					125			
Asp	Val	Phe	Glu	His	Ala	Gly	Ala	Arg	Asp	Val	Ile	Arg	Arg	Glu	Asp
	130					135					140				
Phe	Ala	Lys	Thr	Gly	Ala	Thr	Thr	Met	Arg	Glu	Val	Leu	Asn	Arg	Ile
145					150					155					160
Pro	Gly	Val	Ser	Ala	Pro	Glu	Asn	Asn	Gly	Thr	Gly	Ser	His	Asp	Leu
				165					170					175	
Ala	Met	Asn	Phe	Gly	Ile	Arg	Gly	Leu	Asn	Pro	Arg	Leu	Ala	Ser	Arg
			180					185					190		
Ser	Thr	Val	Leu	Met	Asp	Gly	Ile	Pro	Val	Pro	Phe	Ala	Pro	Tyr	Gly
		195					200					205			
Gln	Pro	Gln	Leu	Ser	Leu	Ala	Pro	Val	Ser	Leu	Gly	Asn	Met	Asp	Ala
		210				215					220				
Ile	Asp	Val	Val	Arg	Gly	Gly	Gly	Ala	Val	Arg	Tyr	Gly	Pro	Gln	Ser
225					230					235					240
Val	Gly	Gly	Val	Val	Asn	Phe	Val	Thr	Arg	Ala	Ile	Pro	Gln	Asp	Phe
				245					250					255	
Gly	Ile	Glu	Ala	Gly	Val	Glu	Gly	Gln	Leu	Ser	Pro	Thr	Ser	Ser	Gln
			260					265					270		
Asn	Asn	Pro	Lys	Glu	Thr	His	Asn	Leu	Met	Val	Gly	Gly	Thr	Ala	Asp
		275					280					285			
Asn	Gly	Phe	Gly	Thr	Ala	Leu	Leu	Tyr	Ser	Gly	Thr	Arg	Gly	Ser	Asp
		290				295					300				
Trp	Arg	Glu	His	Ser	Ala	Thr	Arg	Ile	Asp	Asp	Leu	Met	Leu	Lys	Ser
305				310						315					320

Lys	Tyr	Ala	Pro	Asp	Glu	Val	His	Thr	Phe	Asn	Ser	Leu	Leu	Gln	Tyr	
				325					330					335		
Tyr	Asp	Gly	Glu	Ala	Asp	Met	Pro	Gly	Gly	Leu	Ser	Arg	Ala	Asp	Tyr	
				340					345					350		
Asp	Ala	Asp	Arg	Trp	Gln	Ser	Thr	Arg	Pro	Tyr	Asp	Arg	Phe	Trp	Gly	
				355					360					365		
Arg	Arg	Lys	Leu	Ala	Ser	Leu	Gly	Tyr	Gln	Phe	Gln	Pro	Asp	Ser	Gln	
				370					375					380		
His	Lys	Phe	Asn	Ile	Gln	Gly	Phe	Tyr	Thr	Gln	Thr	Leu	Arg	Ser	Gly	
385					390					395					400	
Tyr	Leu	Glu	Gln	Gly	Lys	Arg	Ile	Thr	Leu	Ser	Pro	Arg	Asn	Tyr	Trp	
				405					410					415		
Val	Arg	Gly	Ile	Glu	Pro	Arg	Tyr	Ser	Gln	Ile	Phe	Met	Ile	Gly	Pro	
				420					425					430		
Ser	Ala	His	Glu	Val	Gly	Val	Gly	Tyr	Arg	Tyr	Leu	Asn	Glu	Ser	Thr	
				435					440					445		
His	Glu	Met	Arg	Tyr	Tyr	Thr	Ala	Thr	Ser	Ser	Gly	Gln	Leu	Pro	Ser	
				450					455					460		
Gly	Ser	Ser	Pro	Tyr	Asp	Arg	Asp	Thr	Arg	Ser	Gly	Thr	Glu	Ala	His	
465					470					475					480	
Ala	Trp	Tyr	Leu	Asp	Asp	Lys	Ile	Asp	Ile	Gly	Asn	Trp	Thr	Ile	Thr	
				485					490					495		
Pro	Gly	Met	Arg	Phe	Glu	His	Ile	Glu	Ser	Tyr	Gln	Asn	Asn	Ala	Ile	
				500					505					510		
Thr	Gly	Thr	His	Glu	Glu	Val	Ser	Tyr	Asn	Ala	Pro	Leu	Pro	Ala	Leu	
				515					520					525		
Asn	Val	Leu	Tyr	His	Leu	Thr	Asp	Ser	Trp	Asn	Leu	Tyr	Ala	Asn	Thr	
				530					535					540		
Glu	Gly	Ser	Phe	Gly	Thr	Val	Gln	Tyr	Ser	Gln	Ile	Gly	Lys	Ala	Val	
545					550					555					560	
Gln	Ser	Gly	Asn	Val	Glu	Pro	Glu	Lys	Ala	Arg	Thr	Trp	Glu	Leu	Gly	
				565					570					575		
Thr	Arg	Tyr	Asp	Asp	Gly	Ala	Leu	Thr	Ala	Glu	Met	Gly	Leu	Phe	Leu	
				580					585					590		
Ile	Asn	Phe	Asn	Asn	Gln	Tyr	Asp	Ser	Asn	Gln	Thr	Asn	Asp	Thr	Val	
				595					600					605		
Thr	Ala	Arg	Gly	Lys	Thr	Arg	His	Thr	Gly	Leu	Glu	Thr	Gln	Ala	Arg	
				610					615					620		

Tyr Asp Leu Gly Thr Leu Thr Pro Thr Leu Asp Asn Val Ser Ile Tyr
625 630 635 640

Ala Ser Tyr Ala Tyr Val Asn Ala Glu Ile Arg Glu Lys Gly Asp Thr
645 650 655

Tyr Gly Asn Leu Val Pro Phe Ser Pro Lys His Lys Gly Thr Leu Gly
660 665 670

Val Asp Tyr Lys Pro Gly Asn Trp Thr Phe Asn Leu Asn Ser Asp Phe
675 680 685

Gln Ser Ser Gln Phe Ala Asp Asn Ala Asn Thr Val Lys Glu Ser Ala
690 695 700

Asp Gly Ser Thr Gly Arg Ile Pro Gly Phe Met Leu Trp Gly Ala Arg
705 710 715 720

Val Ala Tyr Asp Phe Gly Pro Gln Met Ala Asp Leu Asn Leu Ala Phe
725 730 735

Gly Val Lys Asn Ile Phe Asp Gln Asp Tyr Phe Ile Arg Ser Tyr Asp
740 745 750

Asp Asn Asn Lys Gly Ile Tyr Ala Gly Gln Pro Arg Thr Leu Tyr Met
755 760 765

Gln Gly Ser Leu Lys Phe
770

<210> 16

<211> 10183

<212> DNA

<213> Escherichia coli

<400> 16

ttaactttat gacatcatatc tgcttttaga agtgaaaaat taaaagggag agactccgct 60
ctcccattat tggctatttt gcagggttac tgcgtggtac cgtcggtttt ggtatcgaca 120
tcattattga tgccatcacc ggtttgtacc tttttattga tatccggaca gcgaccatct 180
ttgcacatgg tgttcttgtg ctcttcatct ttggtcattc cgtcattgtt cattgaagaa 240
ccatccgaat gcagcattgt gccgccagaa ccggtattta ccccgttatt gtcgacgtta 300
tttggcgcga cattttcaag ggcgtcaggg gctacctggc ccgcatcagc tgcggcgttt 360
gcctggccgt tattagtttg cgctccgcta tcggcagcca gtgcggcacc gctggcaagg 420
cttagagtgg cagtcagaaa taatgtggcc agttttgtca ttttcatagg atgctcctgt 480
tatggtcggt atgtcggata acctcttcca acagtgcatt tgcagggtgaa tataaggcat 540
tggtttaaga tttcagccag gttatgaaac gcagcagaga atcttgaaat aattaacaaa 600

caaaggagtt acagttagaa attgtaggag agatctcggtt tttcgcgaca atctggcggtt 660
 tttcttgcta attccaggat taatcogttc atagtgtaaa accccgttta cacattctga 720
 cggaagatat agattggaag tattgcattc actaagataa gtatggcaac actggaacag 780
 acatgaatta tcagaacgac gatttacgca tcaaagaaat caaagagtta cttcctcctg 840
 tcgcattgct ggaaaaattc cccgctactg aaaatgcgcg gaatacgggt gcccatgccc 900
 gaaaagcgat ccataagatc ctgaaaggta atgatgatcg cctgttggtt gtgattggcc 960
 catgctcaat tcatgatcct gtcgcggcaa aagagtatgc cactcgcttg ctggcgctgc 1020
 gtgaagagct gaaagatgag ctggaaatcg taatgcgcgt ctattttgaa aagccgcgta 1080
 ccacggtggg ctggaaaggg ctgattaacg atccgcatat ggataatagc ttccagatca 1140
 acgacggtct gcgtatagcc cgtaaattgc tgcttgatat taacgacagc ggtctgccag 1200
 cggcagggtga gtttctcgat atgatcacc cacaatatct cgctgacctg atgagctggg 1260
 gcgcaattgg cgcacgtacc accgaatcgc aggtgcaccg cgaactggca tcagggcttt 1320
 cttgtccggt cggcttcaaa aatggcaccg acggtacgat taaagtggct atcgatgcca 1380
 ttaatgcgcg cgggtgcgcg cactgcttcc tgtccgtaac gaaatggggg cattcggcga 1440
 ttgtgaatac cagcggtaac ggcgattgcc atatcattct gcgcggcggt aaagagccta 1500
 actacagcgc gaagcacggt gctgaagtga aagaagggt gaacaaagca ggctgccag 1560
 cacaggatgat gatcgatttc agccatgcta actcgtccaa acaattcaaa aagcagatgg 1620
 atgtttgtgc tgacgtttgc cagcagattg ccggtggcga aaaggccatt attggcgtga 1680
 tggtggaaaag ccactctggtg gaaggcaatc agagcctcga gagcggggag ccgctggcct 1740
 acggtaagag catcaccgat gcctgcatcg gctgggaaga taccgatgct ctgttacgtc 1800
 aactggcgaa tgcagtaaaa gcgcgtcgcg ggtaagggtt aattgtcgga tgcgccgtca 1860
 gagtggcgta tccgatgaat caccacaggc ctgataagtc gcgcagcgtc gcatcaggca 1920
 atgtgctcca ttgttagcaa caaaaaagcc gactcacttg cagtcggctt tctcatttta 1980
 aacgaatgac gtttacttcg ctttaccctg gtttgcaacc gccgctgctt tcgctgcgat 2040
 ctcgtcagca ttaccagat aatagcgttt cagcgggttg aaattctcgt cgaactcata 2100
 caccagcggc acgccagtcg ggatattaag ctcaagaatc tcttcttcgc tcatgttatc 2160
 aagatatttc accagcgcac gtaaagagtt accgtgtgca gcgatgatca cgcgctcacc 2220
 gctcttcata cgcggcagaa tagtttcatt ccagtaaggg atcacgcggt caatggtcag 2280

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

cgccaggcctt	tcogtcagcg	gcagttcttt	ctcgctcagt	ttcgcgtaac	gcggatcgtg	2340
accgcgataa	cgctcatcat	ctttagtcag	ttccggcgga	gtcactgcaa	aaccacgacg	2400
ccactgtttc	acctgctcgt	cgccatactt	ttcagcagtt	tccgctttgt	tcagaccctg	2460
caacgcaccg	tagtgacggt	cgttcagttt	ccaggatttc	tcaacgggca	gccatgcctg	2520
atccagttcg	tccagcacat	tccacagggt	atggatagcg	cgtttcagca	cagaagtgtg	2580
agcaaagtca	aagctgtaac	cttcctcttt	cagcagctta	cctgctgctt	ttgcttcgct	2640
tacgcctttc	tcagacagat	ccacgtcgta	ccaaccgggtg	aaacggtttt	ctttgttcca	2700
ctgactttcg	ccatgacgaa	ccagaaccag	cttagttaca	gccatatact	tactcctcaa	2760
atcatctttt	aatgataata	attctcatta	tattgccgcg	acgaagcaac	agcaatgctt	2820
acgcataacc	atagcgaaaa	tagtggcgca	gtgtaagggt	gttgtgaata	ttgagttgca	2880
aatatgtcgg	tgtttgctgg	tgatttgaac	aatatgagat	aaagccctca	tgacgagggc	2940
gtaacattac	tcagcaataa	actgatattc	cgtcagggtg	gaatactctt	cgccaggacg	3000
caggaagcag	tccggttgcg	gccattcagg	gtggttcggg	ctgtccggta	gaaactcgct	3060
ttccagagcc	agcccttgcc	agtcggcgta	aggttcgggt	ccccgcgacg	gtgtgccgcc	3120
gaggaagttg	cgggagtaga	attgcagagc	cggagcgggtg	gtgtagacct	tcagctgcaa	3180
ttttcatct	gctgaccaga	catgcgcgcg	cactttcttg	ccatcgctt	tggcctgtaa	3240
caagaatgcg	tgatcgtaac	ctttcacttt	gcgctgatcg	tcgtcggcaa	gaaactcact	3300
ggcgatgatt	ttggcgctgc	ggaaatcaaa	agacgttccg	gcgacagatt	tcaggccgtc	3360
gtgcggaatg	cgccttcat	caaccggcag	atattogtcc	gccagaatct	gcaacttgtg	3420
attgcgcacg	tcagactgct	cgccgtcaag	attgaaatag	acgtgattag	tcatatccac	3480
cgggcaaggt	ttatcaactg	tggcgcgata	agtaatggag	atacggttat	cgtcggtcag	3540
acgatattgc	accgtcgcgc	cgagattacc	cggaagccc	tgatcaccat	catctgaact	3600
cagggcaaac	agcacctgac	gatcgttctg	gttcacaatc	tgccagcgac	gtttgtcgaa	3660
cccttcgggc	ccgccgtgca	gctggttaac	gccctgactt	ggcgaaagcg	tcacggtttc	3720
accgtcaaag	gtataacggc	tattggcgat	acggttgga	taacgaccaa	tagaggcccc	3780
cagaaacgcg	gcctgatcct	gatagcattc	cgggctggca	cagccgagca	gcgcctcgcg	3840
gacgctgcca	tcggaaagcg	gaatacgggc	ggaaagtaaa	gtcgcacccc	agtccatcag	3900
cgtgactacc	atccctgcgt	tgttacgcaa	agttaacagt	cggtagcggt	gaccatcggg	3960
tgccagtgcg	ggagtttcgt	tcagcactgt	cctgctcctt	gtgatggttt	acaaacgtaa	4020

aaagtctctt	taataacctgt	ttttgcttca	tattgttcag	cgacagcttg	ctgtacggca	4080
ggcaccagct	cttcgggat	cagcgcgacg	atacagccgc	caaatccgcc	gccggtcatg	4140
cgtacgccac	ctttgtcgcc	aatcacagct	ttgacgattt	ctaccagagt	gtcaatttgc	4200
ggcacggtga	tttcgaaatc	atcgcgcata	gaggcatgag	actccgccat	caactcgccc	4260
atacgtttca	cgctgccttg	ctccagcgcg	ctggcagctt	caacggtgcg	ggcgttttca	4320
gtcagtatat	gacgcacgcg	ttttgccacg	atcgggtcca	gttcatgcgc	aacagcgttg	4380
aactcttcaa	tgggtgacatc	acgcagggct	ggctgctgga	agaaacgcgc	accggtttcg	4440
cactgttcac	gacgggtggt	gtattcgctg	ccaaccaggg	tacgtttgaa	gttactgttg	4500
atgatgacga	cagccacacc	tttgggcatg	gaaactgctt	tgggtcccag	tgagcggcaa	4560
tcgatcagca	aggcatgata	tttcttgccg	agcgcggaaa	ttagctgata	catgatcccg	4620
cagttacagc	ctacaaaactg	gttttctgct	tcttgaccgt	taagcgcgat	ttgtgcgccg	4680
tccagcggca	gatgataaag	ctgctgcaat	acggttccga	ccgcgacttc	cagtgaagcg	4740
gaagaactta	acccggcacc	ctgcggcaca	ttgccgctga	tcaccatgtc	cacgccgccg	4800
aagctgttgt	tacgcagttg	cagatgtttc	accacgccac	gaacgtagtt	agcccattga	4860
tagttttcat	gtgcgacaat	gggcgcacat	agggaaaact	cgtcgagctg	attttcataa	4920
tcggctgcc	tcacgcgaac	tttacgggtc	tgcggtggtg	cacaactgat	cacggtttga	4980
taatcaatcg	cgcagggcag	aacgaaaccg	tcgttgtagt	cgggtgtgtt	accaatcaaa	5040
ttcacgcggc	caggcgcctg	aatggtgtga	gtggcagggg	agccaaatgc	gttggcaaac	5100
agagattgtg	ttttttcttt	cagaactcatt	tcttacactc	cggattcgcg	aaaatggata	5160
tcgctgactg	cgcgcaaacg	ctctgctgcc	tgttctgcgg	tcaggtctcg	ctgggtctct	5220
gccagcattt	cataaccaac	cataaattta	cgtacgggtg	cggagcgcag	cagaggcgga	5280
taaaagtgcg	cgtgcagctg	ccagtgttga	ttctcttgcg	cattaaatgg	cgcgccgtgc	5340
cagcccatag	agtaggggaa	ggagcactgg	aagaggttgt	cataacgact	ggtcagcttt	5400
ttcaacgcc	gcgccagatc	gctgcgctgg	gcgtcgggtc	aatcggtgat	ccgtaaaacg	5460
tgggctttgg	gcagcagtag	cgtttcgaac	ggccaggcag	cccagtaagg	cacgacggct	5520
aaccagtgtt	cggtttcgac	aacggtacgg	ctaccgtctg	ccagctcgcg	ctgaacataa	5580
tccaccagca	ttggtgattt	ctgttcggca	aaatattctt	tttgaggcg	gtcttcgcgc	5640
tcagcttcgt	taggcaggaa	gctatttgcc	caaactcgac	cgtgcggatg	cgggttagag	5700

cagcccatcg ccgcgccttt gttttcaaaa acctgcaccc atgggtacgt tttcccagt 5760
tctgcggttt gctcctgcc a ggttttgacg atttccgtca atgctgcaac gctgagctct 5820
ggcagcggtt tactgtgatc cggtgaaaag cagatcaccc ggctgggtgcc gcgcgcgctc 5880
tggcaacgca tcagcggatc gtgactttct ggcgcatctg gcgtgtcaga catcaaagcc 5940
gcaaagtc atgtgaaaac gtaagtcccg gtgtaatcgg ggtttttatc gcctgtcacc 6000
cgcacattac ctgcgcagag gaagcaatct ggatcgtgcg caggtaaacac ctggttggt 6060
ggcgtttctt gcgccccctg ccagggggcg ttagcgcggt gcggtgaaac cagaatccat 6120
tgcccgggtga gcgggttgta gcggcgatgt ggatgatcaa cgggattaaa ttgcgtcatg 6180
gtcgttctt aatcgggata tccctgtgga tggcgtgact gccagtgcc a ggtgtcctgc 6240
gccatttcat cgagtgtgcg cgttacgcgc cagttcagtt cacggtcggc tttgctggcg 6300
tccgcccagt aggccggaag gtcgcctcgc cgacgcggtg caaatgata attaacgggt 6360
ttgcgcgagg ctttgcgtgaa ggcattaacc acgtccagca cgctgttgcc tacgccagcg 6420
ccgaggttgt agatgtgtac gcctggcttg ttccgcagtt tttccatcgc cacgacgtga 6480
ccgtccgcc a gatccattac gtggatgtaa tcgcgtacgc cagtaccatc ttcggtcgga 6540
taatcgttac caaaaatcgc cagcgagtcg cgacggccta cagcaacctg ggcatgtat 6600
ggcatcaggt tattcggaat gccttgcgga tcttcgccca tatcgcccga cggatgcgcg 6660
ccaaccgggt tgaagtagcg cagcagggca atgctccagt ccggctgggc tttttgcaga 6720
tcggtgagga tctgttccac catcagcttg cttttgcogt aagggtttg cgggtgtgccg 6780
gtcgggaagc tttcaacgta tggaattttg ggctgatcgc cataaacgggt ggcggaggag 6840
ctaaaaataa agtttttgac gttagcggcg cgcatggcg taatcaggcg cagagtgcg 6900
ttgacattgt tgtcgtataa ttccagcgggt ttttgtagcg attcgccac ggctttcagc 6960
ccggcggaagt ggatcacgggt gtcgatagcg tgatcgtgca ggatctcgggt catcaacgct 7020
tcgttacgaa tatcgcttc aacaaacgtt ggatgtttgc cgctaaaacg ctcgataaca 7080
ggcagtacgc tgcgcttact gttacagagg ttatcaagaa tgatgacatc atgaccgttt 7140
tgcatgaatt gcacacaggt atgacttcca atgtaaccgc taccaccgggt aaccagaact 7200
ctcataattc gctccattag gcttatggta tgaaataacc atagcataac aaagatgcga 7260
aaagtgtgac atggaataaa ttagtggaat cgtttacaca agaatttagc cgttttttat 7320
gcgcgattaa gtgattataa aacagaggggt ttatgaatga ttgcgtttt tatctgaaaa 7380
aagacgcggt ttc atgcctg catgcgtcga accgttggtc ggagaggggtg ctaaggccgc 7440

tcgggtagcg ccattaatac ttgcactgc tctgcgcgc gctcaatatg actaataata 9180
cccggtaatt ggttgtcagc gttttgcgcg accgcctcgt cctgagtaat acctacccac 9240
ggcgctttta gcaatatcaa cacttctttg ctttcatcca gcccagacg cgcgccgctt 9300
tgtgcggtaa ttgcgacttt caggcgtggt tttccgtcag ccagtaagac atcaacatgc 9360
tggtgaacgt catcatgata gcgggcgggtg atggtaccga accactgggt acgggcgctg 9420
gtttgcagtg aaaaacgtga gatcgcggcc agcaggctgt tcagcggcag ggcgatcatc 9480
tcacttaaca catcaaaggc tttttgctgg atttgcgcca gtaagtcata gagctgaatc 9540
agtcgctgac catagcgggt cagtaactgcg ccgcgcgcac ctttaccgcc tgttgcgcgc 9600
tcgaccagaa tatgctcact taactgattc atctcgttaa tggcatcca ggcgctttta 9660
tagctaatac cggcatcttt cgctccctgg ctaatggaac cggaaagcgc aatgtgtttt 9720
agtagcgaaa tgcggcgcgc gtcggcgaat aatttttgtt ggagcttaag ggtgagaagg 9780
atttcggcct gcataacaat gtccctggcaa aagtcttatt gtgacggaaa acgaacgcca 9840
cgcaaagctg accgcacaaa aggggagtg c tttctgtgc ttagcgggtta gaatagtctc 9900
atgactatat ctggagttga ccatgttaga gttattaaaa agtctgggtat tcgccgtaat 9960
catggtacct gtcgtgatgg ccatcatcct ggggtctgatt tacggctctg gtgaagtatt 10020
caacatcttt tctgggtgtg gtaaaaaaga ccagcccga caaatcatt gattccctga 10080
atgcccgctt agtcgggcat tttcttttc tcaacttcct gcttttctg ccgatatttt 10140
ttcttatcta cctcaciaag gttagcaata actgctggga aaa 10183

<210> 17

<211> 382

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 3981-5129 of seq id 16

<400> 17

Met	Ser	Leu	Lys	Glu	Lys	Thr	Gln	Ser	Leu	Phe	Ala	Asn	Ala	Phe	Gly
1				5					10					15	

Tyr	Pro	Ala	Thr	His	Thr	Ile	Gln	Ala	Pro	Gly	Arg	Val	Asn	Leu	Ile
			20					25					30		

Gly	Glu	His	Thr	Asp	Tyr	Asn	Asp	Gly	Phe	Val	Leu	Pro	Cys	Ala	Ile
		35					40					45			

Asp	Tyr	Gln	Thr	Val	Ile	Ser	Cys	Ala	Pro	Arg	Asp	Asp	Arg	Lys	Val
	50						55					60			

Arg Val Met Ala Ala Asp Tyr Glu Asn Gln Leu Asp Glu Phe Ser Leu
 65 70 75 80
 Asp Ala Pro Ile Val Ala His Glu Asn Tyr Gln Trp Ala Asn Tyr Val
 85 90 95
 Arg Gly Val Val Lys His Leu Gln Leu Arg Asn Asn Ser Phe Gly Gly
 100 105 110
 Val Asp Met Val Ile Ser Gly Asn Val Pro Gln Gly Ala Gly Leu Ser
 115 120 125
 Ser Ser Ala Ser Leu Glu Val Ala Val Gly Thr Val Leu Gln Gln Leu
 130 135 140
 Tyr His Leu Pro Leu Asp Gly Ala Gln Ile Ala Leu Asn Gly Gln Glu
 145 150 155 160
 Ala Glu Asn Gln Phe Val Gly Cys Asn Cys Gly Ile Met Asp Gln Leu
 165 170 175
 Ile Ser Ala Leu Gly Lys Lys Asp His Ala Leu Leu Ile Asp Cys Arg
 180 185 190
 Ser Leu Gly Thr Lys Ala Val Ser Met Pro Lys Gly Val Ala Val Val
 195 200 205
 Ile Ile Asn Ser Asn Phe Lys Arg Thr Leu Val Gly Ser Glu Tyr Asn
 210 215 220
 Thr Arg Arg Glu Gln Cys Glu Thr Gly Ala Arg Phe Phe Gln Gln Pro
 225 230 235 240
 Ala Leu Arg Asp Val Thr Ile Glu Glu Phe Asn Ala Val Ala His Glu
 245 250 255
 Leu Asp Pro Ile Val Ala Lys Arg Val Arg His Ile Leu Thr Glu Asn
 260 265 270
 Ala Arg Thr Val Glu Ala Ala Ser Ala Leu Glu Gln Gly Asp Leu Lys
 275 280 285
 Arg Met Gly Glu Leu Met Ala Glu Ser His Ala Ser Met Arg Asp Asp
 290 295 300
 Phe Glu Ile Thr Val Pro Gln Ile Asp Thr Leu Val Glu Ile Val Lys
 305 310 315 320
 Ala Val Ile Gly Asp Lys Gly Gly Val Arg Met Thr Gly Gly Gly Phe
 325 330 335
 Gly Gly Cys Ile Val Ala Leu Ile Pro Glu Glu Leu Val Pro Ala Val
 340 345 350
 Gln Gln Ala Val Ala Glu Gln Tyr Glu Ala Lys Thr Gly Ile Lys Glu
 355 360 365

225		230		235		240
Val Leu Arg Ile Thr Asp Leu Thr Asp Ala Gln Arg Ser Asp Leu Ala						
		245		250		255
Leu Ala Leu Lys Lys Leu Thr Ser Arg Tyr Asp Asn Leu Phe Gln Cys						
		260		265		270
Ser Phe Pro Tyr Ser Met Gly Trp His Gly Ala Pro Phe Asn Gly Glu						
		275		280		285
Glu Asn Gln His Trp Gln Leu His Ala His Phe Tyr Pro Pro Leu Leu						
		290		295		300
Arg Ser Ala Thr Val Arg Lys Phe Met Val Gly Tyr Glu Met Leu Ala						
		305		310		315
Glu Thr Gln Arg Asp Leu Thr Ala Glu Gln Ala Ala Glu Arg Leu Arg						
		325		330		335
Ala Val Ser Asp Ile His Phe Arg Glu Ser Gly Val						
		340		345		

<210> 19
 <211> 12343
 <212> DNA
 <213> Escherichia coli

<400> 19
 tccggcaaca ttatcccacg catggtcagc aaactgacat tatctctccg ccctggcagg 60
 catcagaaaa tcgctcatac tttaatcggg aaacagcacc tttagatgct gttttcgata 120
 cacaatttca atcaaggagt cattatggct ggttggtttg aactcagtaa gagcagtgat 180
 aatcagttcc ggtttgtgct aaaagcgggc aatgggtgaga ctatcctcac cagcgagctt 240
 tatacctcaa aaacctctgc ggaaaagggc atcgcgtcgg tgcgtagcaa cagcccgcaa 300
 gaagaacgct atgagaaaaa aacggcaagt aacggcaaat tctatttcaa tctgaaagcc 360
 gctaatacat aaattatcgg ctccagccag atgtacgcca ccgcgcaatc tcgtgaaacc 420
 ggaattgcct cgtttaagc caatggcaca agccagacgg tgaaagacaa tacgtaatta 480
 cgatgcgggg cgtgggttgt tggcgctcgg cgctttacca gagccccca cagcgctaca 540
 atgccccgcc ttaaagtggg ggcaactccc taaccgcttc atcaggtgaa gcggatctga 600
 cctgtcatca gaacgagaga attatgttta aaccggaact cttttccccg gcgggaacgc 660
 tgaaaaatat gcgttacgct ttgcgttatg ggcagatgc tgtttatgcg ggccagccgc 720
 gttattccct gcgtgtgcgc aacaacgaat tcaaccacga aaatcttcag ctcgcatca 780
 atgaagccca cgcgctgggg aaaaagtttt atgtcgtggt caacattgca ccgcacaacg 840

atttaccctt acaaaacaaa cagataaaat aaaaacatca ctattatct tctgtttcgt 2580
 accccacatc agaaagcctg acctcaagct ctaatgacgt cgtgaagccg ctattattca 2640
 gaaaatgtgt caccttagtg attgtccagt cctgctcgtc tatgacgcgc ttaaagccag 2700
 acactttgac cgggtgtttcc gtgtaaatat ctgcccagacc ggtagccagg ctgatggaga 2760
 actctgctac acgggcttat ttttttatgc ataagcccta tctctggtaa cgtcttcca 2820
 ttgaccacat cgatagaatc ctcttcata gcacgatgcc tttcacttat cggcatcgtg 2880
 ctcccacagg ttccggctac gcacagccag aacgcgcata tttgacgctt accaaaaaat 2940
 attctcactc tccacatttg aatgtcagac gagcgacacc atgtaatcct acaccttctg 3000
 tcttcagctc aactatttgc atttttttgc cctgagtaac acagaaatga gttgcatcat 3060
 tttttactat attttctgca ccagatattc tacccttggc taaagaagct tcggcttcgg 3120
 tgtagtattg gttatcgagt ttacgctgaa tattactttt atatgcaaga ccaaatttac 3180
 cgatacttgt ctcatcatta tgcacagcac aaccagacat aataaaaata ctaattaatg 3240
 atatagcagc tatctttttc atctcacctt cccccattaa ataccaacga cactctctag 3300
 tgtttaaata taataatggc atgattatta taattgaata ggattataat aaatgttctg 3360
 tacaacattt cctacataag taggaattac ggacattgag gcccttcagg gtaactccat 3420
 gggggcctta atatattata ttgaagatgc cactgttttag ttgaatatta ggtatatgct 3480
 cttttttgaa atttatcggg ggcagccgtt agtattcgtc gtccccattg caagctcctg 3540
 gtggtaacca ctgaatctc catacttgaa ctgacttttt atcctccgac tttcatcctg 3600
 ttctgactcc accttttgtt ttctgctcta cactatctac agaccaatca taaaggcaca 3660
 taogatcatg gcagaatttc ccgccagctt actgattctt aatggcaaaa gtactgacaa 3720
 tetacccttg cgcgaagcaa ttatgctgtt gcgtgaggaa ggaatgacga tccatgtgcy 3780
 ggtcacctgg gagaaaggcg atgccgcacg atatgtagag gaggcccgga agtttgccgt 3840
 cgcaacggtg attgccggtg gtggcgatgg caccattaat gaagtttcta cggcgttgat 3900
 tcagtgtgag ggggatgaca taccgcgctt gggaattttg ccattaggaa ccgccaatga 3960
 ttttgccacc agtgtaggga ttctgaggc actggataag gcgctgaaac tggcaattgc 4020
 cggtgacgcc attgcgatag atatggcgca ggtcaacaaa caaacctgtt ttattaatat 4080
 ggcgacaggc ggatttggga cgcgtattac cacagaaacg ccggaaaaat taaaagccgc 4140
 gctgggtagc gtctcttaca tcattcatgg cttaatgcgt atggatactc tgcaaccgga 4200
 ccgttgtgaa atccgcggtg aaaactttca ctggcaaggt gacgccctgg tcattggtat 4260

11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

tggtaacggg cgtcaggccg gtggcgggtca gcaattgtgt ccgaacgcgt taattaacga 4320
 tggcttgctg caactgcgca tttttaccgg cgatgaaata cttccggctc tcgtatcaac 4380
 cttaaaatct gacgaagata acccgaatat tatcgaaggc gcttcgtcgt ggtttgatat 4440
 tcaggcacca cagcacatca cctttaatct tgatggcgaa ccgttgagtg ggcaaaattt 4500
 tcatattgaa atacttccgg cagcgttgcg ttgtcgatta ccaccagatt gtccactgtt 4560
 gcgttaatca aactattctc tottgaacca gggagaatcc gtaatgccgg atgcggtgta 4620
 aacaccttat ccggcataca gaacaatact acaccgtaat taattttacc cgcgtcttct 4680
 gcaatgccag tttatccacc totgacacag catcatcggg aataataatg tcaatttttt 4740
 cgattggtag tacctgatta aaaccgcgac ggtaaattt cgatgaatcg agaacggcaa 4800
 tcactttatt agcggctgtg accatcgac cgctaataga ataaccttca ttaaaggctc 4860
 taataccatt aaccgcatca ataccatcag caccgacaaa cattaaatcg gcattaatat 4920
 cctgtaatga acgctcggca atggaaccat gcacgcagcg cgttttatgg cggaccgtgc 4980
 caccacagac gaccagagta atgtctttat tttcggaaag ggcaaacgct gccgggagac 5040
 tgttggtaat caccgtgata tttttggcgg tcattaatcc ttcggcgata agcattgtcg 5100
 tacttccgct gtcgagaata acggtctgat cttaccacgc aatagtggac acgcggctaa 5160
 gtgagtaaac tctcagtcag aggtgactca catgacaaaa acagtatcaa ccagtaaaaa 5220
 acccgtaaa cagcattcgc ctgaatttcg cagtgaagcc ctgaagcttg ctgaacgcac 5280
 cgggtgttact gccgcagccc gtgaactcag cctgtatgaa tcacaactct acaactggcg 5340
 cagtaaacag caaaatcagc agacgtcttc tgaacgtgaa ctggagatgt ctaccgagat 5400
 tgcacgtctc aaacgccagc tggcagaacg ggatgaagag ctggctatcc tccaaaaggc 5460
 cggacatac ttcgcgaagc gctgaaatg aagtatgtct ttattgaaaa acatcaggct 5520
 gagttcagca tcaaagcaat gtgccgcgtg ctccgggtgg cccgcagcgg ctggtatacg 5580
 tgggtgtcagc ggccgacaag gataagcacg cgtcagcagt tccgccaaca ctgcgacagc 5640
 gttgtcctcg cggctttttac ccggtcaaaa cagcgttacg gtgccccacg cctgacggat 5700
 gaactgcgtg ctcagggtta cccctttaac gtaaaaaccg tggcggcaag cctgcgccgt 5760
 cagggactga gggcaaaggc ctcccgaag ttcagcccgg tcagctaccg cgcacacggc 5820
 ctgcctgtgt cagaaaatct gttggagcag gatttttacg ccagtggccc gaaccagaag 5880
 tgggcaggag acatcacgta cttacgtaca gatgaaggct ggctgtatct ggcagtggtc 5940

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000


```

ttccggtata accgccaaat tgattgacct ggtttgacgt tgcttcaatc agcactttgc 11160
gcgtgctggt gcgatcaaat gccagcgccg cttcgataac caacggatgg gcagaacaga 11220
ctgaacatat gccgatatgt tcaccagctt tatgccgggc aattaacgtt ttcattgttt 11280
ttccttggtta aatggcagggt gcgttatgcc ctgccctcgc agccacaatc ggcaatcact 11340
ttgctcacca catcgcgcat tgcggattta gccgactgca aataatcccg gggatcggtc 11400
gcttcagggt gctcggtcag gtaatttttt aacgcctgcg agaaggcatt tttcagctcc 11460
gttgcaacgt tgattttgca tatccccagt ttgatggttt gctgaatata cttagtcat 11520
aaccctgacg cgccatgcag caccagcggg aagttcaccc actggcgaat gttctccagt 11580
ctagaaaaat caagcgccgg tgcgctggca tacatcccat gagccgtgcc gatggcgacc 11640
gccaggaat caattccggg tgcctcggca aattcacgog cctgagcggg gttggtgtac 11700
aacgcatcgg cttcattgac ttgcacatca tcttcctggc cgccaagttg cccagctcc 11760
gcctcgacgc tgacatcaaa gcgatggcaa aaatccacca cctctttgac ccgtgaaata 11820
ttttgcgcaa aaggcaaatg cgaggcgtca atcatgactg agcgcacgcc agaacgaacc 11880
ttctgagcga tatcgtcaaa tttcgtgtga tggtcgagat gaattgccag tggatggtga 11940
tattgcttcg ccatcgcgct gaccagcgcc aacagatttt ctgtaccagc atgagtaaat 12000
gtgccaggcg ttccggcgat gatgaccggc gcatgcagggt tggcagcggg ttctaccacc 12060
acttgcatcg tttcgagatt gtgaatattg aatgccggaa ccgcataacc gccgcgctgt 12120
gcgttgttca gcatctgctt tgcgataacc acgtacattt tcatatcctg tcgtttgttt 12180
tcgatttcaa aatataatga aattatttgt ttttaaatat cgagataacg atcacaaaaa 12240
cgacaatatg aaaattattc gaggagtga aggcaaaaaa acggcctccc gatagggaag 12300
ccgtagcaaa gtgcgcgtgt ttttatgccg gatgcggtgt aaa 12343

```

<210> 20

<211> 150

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 9551-10003 of seq id 19

<400> 20

Met	Thr	Asn	Leu	Phe	Val	Arg	Ser	Gly	Ile	Ser	Phe	Val	Asp	Arg	Ser
1				5				10					15		

Glu Val Leu Thr His Ile Gly Asn Glu Met Leu Ala Lys Gly Val Val

20	25	30
His Asp Thr Trp Pro Gln Ala Leu Ile Ala Arg Glu Ala Glu Phe Pro		
35	40	45
Thr Gly Ile Met Leu Glu Gln His Ala Ile Ala Ile Pro His Cys Glu		
50	55	60
Ala Ile His Ala Lys Ser Ser Ala Ile Tyr Leu Leu Arg Pro Thr Asn		
65	70	75
Lys Val His Phe Gln Gln Ala Asp Asp Asp Asn Asp Val Ala Val Ser		
	85	90
Leu Val Ile Ala Leu Ile Val Glu Asn Pro Gln Gln Gln Leu Lys Leu		
100	105	110
Leu Arg Cys Leu Phe Gly Lys Leu Gln Gln Pro Asp Ile Val Glu Thr		
115	120	125
Leu Ile Thr Leu Pro Glu Thr Gln Leu Lys Glu Tyr Phe Thr Lys Tyr		
130	135	140
Val Leu Asp Ser Asp Glu		
145	150	

<210> 21

<211> 451

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 7877-9232 of seq id 19

<400> 21

Met Phe Ser Glu Val Met Arg Tyr Ile Leu Asp Leu Gly Pro Thr Val
1 5 10 15

Met Leu Pro Ile Val Ile Ile Ile Phe Ser Lys Ile Leu Gly Met Lys
20 25 30

Ala Gly Asp Cys Phe Lys Ala Gly Leu His Ile Gly Ile Gly Phe Val
35 40 45

Gly Ile Gly Leu Val Ile Gly Leu Met Leu Asp Ser Ile Gly Pro Ala
50 55 60

Ala Lys Ala Met Ala Glu Asn Phe Asp Leu Asn Leu His Val Val Asp
65 70 75 80

Val Gly Trp Pro Gly Ser Ser Pro Met Thr Trp Ala Ser Gln Ile Ala
85 90 95

Leu Val Ala Ile Pro Ile Ala Ile Leu Val Asn Val Ala Met Leu Leu
100 105 110

bioRxiv preprint doi: <https://doi.org/10.1101/111111>; this version posted March 1, 2017. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

Thr Arg Met Thr Arg Val Val Asn Val Asp Ile Trp Asn Ile Trp His
 115 120 125
 Met Thr Phe Thr Gly Ala Leu Leu His Leu Ala Thr Gly Ser Trp Met
 130 135 140
 Ile Gly Met Ala Gly Val Val Ile His Ala Ala Phe Val Tyr Lys Leu
 145 150 155 160
 Gly Asp Trp Phe Ala Arg Asp Thr Arg Asn Phe Phe Glu Leu Glu Gly
 165 170 175
 Ile Ala Ile Pro His Gly Thr Ser Ala Tyr Met Gly Pro Ile Ala Val
 180 185 190
 Leu Val Asp Ala Ile Ile Glu Lys Ile Pro Gly Val Asn Arg Ile Lys
 195 200 205
 Phe Ser Ala Asp Asp Ile Gln Arg Lys Phe Gly Pro Phe Gly Glu Pro
 210 215 220
 Val Thr Val Gly Phe Val Met Gly Leu Ile Ile Gly Ile Leu Ala Gly
 225 230 235 240
 Tyr Asp Val Lys Gly Val Leu Gln Leu Ala Val Lys Thr Ala Ala Val
 245 250 255
 Met Leu Leu Met Pro Arg Val Ile Lys Pro Ile Met Asp Gly Leu Thr
 260 265 270
 Pro Ile Ala Lys Gln Ala Arg Ser Arg Leu Gln Ala Lys Phe Gly Gly
 275 280 285
 Gln Glu Phe Leu Ile Gly Leu Asp Pro Ala Leu Leu Leu Gly His Thr
 290 295 300
 Ala Val Val Ser Ala Ser Leu Ile Phe Ile Pro Leu Thr Ile Leu Ile
 305 310 315 320
 Ala Val Cys Val Pro Gly Asn Gln Val Leu Pro Phe Gly Asp Leu Ala
 325 330 335
 Thr Ile Gly Phe Phe Val Ala Met Ala Val Ala Val His Arg Gly Asn
 340 345 350
 Leu Phe Arg Thr Leu Ile Ser Gly Val Ile Ile Met Ser Ile Thr Leu
 355 360 365
 Trp Ile Ala Thr Gln Thr Ile Gly Leu His Thr Gln Leu Ala Ala Asn
 370 375 380
 Ala Gly Ala Leu Lys Ala Gly Gly Met Val Ala Ser Met Asp Gln Gly
 385 390 395 400
 Gly Ser Pro Ile Thr Trp Leu Leu Ile Gln Val Phe Ser Pro Gln Asn
 405 410 415

Ile Pro Gly Phe Ile Ile Ile Gly Ala Ile Tyr Leu Thr Gly Ile Phe
 420 425 430

Met Thr Trp Arg Arg Ala Arg Gly Phe Ile Lys Gln Glu Lys Val Val
 435 440 445

Leu Ala Glu
 450

<210> 22
 <211> 10776
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (9140)..(10645)

<400> 22
 gaacataagg gaaaccagta ttcacgctgg atcagcgctcg ttttaggtga gttgttaata 60
 aagatttgga attgtgacac agtgcaaatt cagacacata aaaaaacgtc atcgcttgca 120
 ttagaaaggt ttctggccga ccttataacc attaattacg aagcgcaaaa aaaataatat 180
 ttctctcattt tccacagtga agtgattaac tatgctgatt ccgtaaaaac taagtcgtcc 240
 gggttcgactc gaccataccg tggttcgtga gcgcctgctg gctaaacttt ccggcgcgaa 300
 caacttccgg ctggcgctga tcacgagtc tgcgggctac ggaaagacca ccctcatttc 360
 ccagtgggcg gcaggcaaaa acgatatcgg ctggtactcg ctggatgaag gtgataacca 420
 gcaagagcgt ttcgccagct atctcattgc cgccgtgcag caggcaacca acggtcactg 480
 tgcgatatgt gagacgatgg cgcaaaaacg gcaatatgcc agcctgacgt cactcttcgc 540
 ccagcttttc attgagctgg cggaatggca tagccactt tatctggtca tcgatgacta 600
 tcatctgate actaatccag tgatccacga gtcaatgcgc ttctttattc gccatcaacc 660
 agaaaatctc accctggtgg tgttgtcacg caaccttccg caactgggca ttgccaatct 720
 gcgtgttcgt gatcaactgc tggaaattgg cagtcagcaa ctggcattta cccatcagga 780
 agcgaagcag ttttttgatt gccgtctgtc atcgccgatt gaagccgcag aaagcagtcg 840
 gatttgcatg gacgtttccg gttgggacac ggcaactacag ctaatcgccc tctccgccc 900
 gcagaatacc cactcagccc ataagtcggc acgccgcctg gcgggaatca atgccagcca 960
 tctttcggat tatctggtcg atgaggtttt ggataacgtc gatctcgcaa cgcgccattt 1020
 tctgttgaaa agcgccattt tgcgctcaat gaacgatgcc ctcatcaccg gtgtgaccgg 1080
 cgaagaaaac gggcaaatgc gcctcgaaga gattgagcgt caggggctgt ttttacagcg 1140

gatggatgat accggcgagt ggttctgcta tcacccgctg tttggtaact tcctgcgcca 1200
gcgctgccag tgggaactgg cggcggagct gccggaaatc caccgtgccg ccgcagaaag 1260
ctggatggcc cagggatttc ccagcgaagc aattcatcat gcgctggcgg caggcgatgc 1320
gctgatgctg cgcgatattc tgcttaatca cgccctggagt ctgttcaacc atagcgaact 1380
gtcgtgctg gaagagtcgc ttaaggccct gccgtgggac agcttgctgg aaaatccgca 1440
gttggtgtta ttgcaggcgt ggctgatgca aagccaacat cgctacggcg aagttaacac 1500
cctgctagcc cgtgctgaac atgaaatcaa ggacatcaga gaagacacca tgcacgcaga 1560
atttaacgct ctgcgcgccc aggtggcgat taacgatggt aatccggatg aagcggaaag 1620
gctggcaaaa ctggcactgg aagagctgcc gccgggctgg ttctatagcc gcattgtggc 1680
aacctcgggtg ctgggtgaag tgctgcactg caaaggcgaa ttgacccgct cactggcgct 1740
aatgcagcaa accgaacaga tggcacgcca gcacgatgtc tggcactacg ctttgtggag 1800
tttaatccag caaagtgaat ttctgtttgc ccaagggttc ctgcaaaccg cgtgggaaac 1860
gcaggaaaaa gcattccagc tgatcaacga gcagcatctg gaacagctgc caatgcatga 1920
gtttctggtg cgcattcgtg cgcagctgtt atgggcctgg gcgcggtg atgaagccga 1980
agcgtcggcg cgtagcggga ttgaagtctt gtgctcttat cagccacagc aacagcttca 2040
gtgcctggca atgttgattc aatgctcgtt ggcccgtggt gatttagata acgcccgtag 2100
ccagctgaac cgtctggaat acctgctggg gaatggcaaa tatcacagcg actggatctc 2160
taacgccaac aaagtccggg tgatttactg gcaaatgacc ggcgataaag ccgccgctgc 2220
caactgggtg cgtcatagcg ctaaaccaga gtttgcaaac aaccacttcc tgcaagggtca 2280
atggcgcaac attgccctg cacaaatctt gctgggcgag tttgaaccgg cagaaattgt 2340
tctogaagaa ctcaatgaat atgcccgag tctgcggtt atgagcgatc tcaaccgtaa 2400
cctgttgctg cttaatcaac tgtactggca ggccggacgt aaaagtgcg cccagcgcgt 2460
gttgctggac gcattaaaac tggcgaatcg caccggattt atcagccatt ttgtcatcga 2520
aggcgaagcg atggcgcaac aactgcgtca gctgattcag cttaatagc tgccggaact 2580
ggaacagcat cgcgcgcagc gtattctgcy agaaatcaat caacatcatc ggcatataatt 2640
cgccatttct gatgagaatt tcgttgaacg tctgctaaat catcctgaag tacctgaact 2700
gatccgcacc agcccgtga cgcaacgtga atggcaggta ctggggctga tctactctgg 2760
ttacagcaat gagcaaattg ccggagaact ggaagtcgcy gcaaccacca tcaaaacgca 2820

agcccgc	ccaa	accacg	gccc	gctga	at	ttt	tgtgc	acat	agccg	ctta	caggg	cgtg	8040			
ataagc	gtaa	tgaca	attag	cttacc	gcta	ccgagg	cggt	tttcc	accgc	accgc	cgaga	8100				
taccacc	acc	agagc	aggt	aaagag	gata	tgc	atc	agc	aga	agt	gcat	taacg	cgtg	8160		
gtgaag	taac	gccaga	aactc	aaatttc	ag	gttg	gat	cga	atgg	ccagg	cagcc	ataac	8220			
atcact	tcct	gatcg	ccgag	aatttg	catg	gcaata	aaaca	ccacc	acgca	ggc	gat	catc	8280			
atcacc	ccagg	ttacc	ggacc	tgcgc	gttca	cgcaag	gcgg	caaaga	aaagg	ataac	ggcga	8340				
taatgc	caggc	cactg	ccggt	atggc	ctg	tgcc	agct	cgc	ccag	ata	acgc	gat	ct	8400		
gccggg	gtttt	cgagaaa	acg	cgccac	gtcc	gccc	gtac	gc	gctcg	ggc	ctg	ggact	cat	cc	8460	
gccagc	ccaga	catcg	ctttg	gttat	gttgt	tgaat	cgtga	ggata	aac	ctgc	gtcg	cc	8520			
atgta	atcaa	caaac	gcctg	cgccac	gcgg	gggtt	tag	caa	aagag	gta	at	cat	caac	atc	8580	
gttgct	gtcg	cttatt	ccac	acaaa	agggg	acagt	tata	aaa	gcgtt	acgc	ccgt	acgc	ca	8640		
cctctg	cg	aaact	gacgt	tgcc	aggctt	caaag	cgc	cc	gtca	atg	cta	tag	acc	acat	8700	
cgtag	ccctg	ttgc	agcaga	tactg	cgccg	cgcc	tttg	ct	gtatt	gccg	tgata	acaca	8760			
tcacc	atcac	cggag	tgtca	aagtc	gttat	cacgc	ata	aaa	agcgc	ccagc	gtgtc	gttgg	8820			
ttaa	atggaa	agcct	gcacc	gcat	gtccca	ttgc	gaaa	act	ctgtg	gatcg	cgaat	atcga	8880			
ccagc	accgc	ctct	ttttcc	tgca	acttct	ggtg	cgcg	tc	ggca	acgtta	atac	attcga	8940			
actg	atccat	gcgt	ctctct	ttct	tttaca	acaag	tgggc	aaatt	taccg	cacag	tttac	9000				
gtcga	agcgg	cagata	aaacg	ccata	atg	gtt	atac	atatca	ctcta	aaa	atg	tttttt	caat	9060		
gttac	c	taaaa	gcgcg	attct	ttg	cta	atat	gttgc	gata	ac	gaac	attt	tat	gagctt	taac	9120
gaaag	tgaat	gaggg	cagc	atg	gaa	acc	aaa	gat	ctg	att	gtg	ata	ggg	ggc	9172	
				Met	Glu	Thr	Lys	Asp	Leu	Ile	Val	Ile	Gly	Gly		
				1				5					10			
ggc	atc	aat	ggt	gct	ggt	atc	gcg	gca	gac	gcc	gct	gga	cgc	ggt	tta	9220
Gly	Ile	Asn	Gly	Ala	Gly	Ile	Ala	Ala	Asp	Ala	Ala	Gly	Arg	Gly	Leu	
			15					20					25			
tcc	gtg	ctg	atg	ctg	gag	gcg	cag	gat	ctc	gct	tgc	gog	acc	tct	tcc	9268
Ser	Val	Leu	Met	Leu	Glu	Ala	Gln	Asp	Leu	Ala	Cys	Ala	Thr	Ser	Ser	
			30				35					40				
gcc	agt	tca	aaa	ctc	att	cac	ggt	ggc	ctg	cgc	tac	ctt	gag	cac	tat	9316
Ala	Ser	Ser	Lys	Leu	Ile	His	Gly	Gly	Leu	Arg	Tyr	Leu	Glu	His	Tyr	
			45			50					55					
gaa	ttc	cgc	ctg	gtc	agc	gag	gcg	ctg	gct	gaa	cgt	gaa	gtg	ctg	ctg	9364
Glu	Phe	Arg	Leu	Val	Ser	Glu	Ala	Leu	Ala	Glu	Arg	Glu	Val	Leu	Leu	

ttt aaa aag cag tta agc cgt gac gat atc gtc tgg acc tac tcc ggt 10084
 Phe Lys Lys Gln Leu Ser Arg Asp Asp Ile Val Trp Thr Tyr Ser Gly
 300 305 310 315

gtg cgt ccg ctg tgt gat gat gag tcc gac tcg ccg cag gct att acc 10132
 Val Arg Pro Leu Cys Asp Asp Glu Ser Asp Ser Pro Gln Ala Ile Thr
 320 325 330

cgt gat tac acc ctt gat att cat gat gaa aat ggc aaa gca ccg ctg 10180
 Arg Asp Tyr Thr Leu Asp Ile His Asp Glu Asn Gly Lys Ala Pro Leu
 335 340 345

ctg tcg gta ttc ggc ggt aag ctg acc acc tac cga aaa ctg gcg gaa 10228
 Leu Ser Val Phe Gly Gly Lys Leu Thr Thr Tyr Arg Lys Leu Ala Glu
 350 355 360

cat gcg ctg gaa aaa cta acg ccg tat tat cag ggt att ggc ccg gca 10276
 His Ala Leu Glu Lys Leu Thr Pro Tyr Tyr Gln Gly Ile Gly Pro Ala
 365 370 375

tgg acg aaa gag agt gtg cta ccg ggt ggc gcc att gaa ggc gac cgc 10324
 Trp Thr Lys Glu Ser Val Leu Pro Gly Gly Ala Ile Glu Gly Asp Arg
 380 385 390 395

gac gat tat gcc gct cgc ctg cgc cgc cgc tat ccg ttc ctg act gaa 10372
 Asp Asp Tyr Ala Ala Arg Leu Arg Arg Arg Tyr Pro Phe Leu Thr Glu
 400 405 410

tcg ctg gcg cgt cat tac gct cgc act tac ggc agc aac agc gag ctg 10420
 Ser Leu Ala Arg His Tyr Ala Arg Thr Tyr Gly Ser Asn Ser Glu Leu
 415 420 425

ctg ctc ggc aat gcg gga acg gta agc gat ctc ggg gaa gat ttc ggt 10468
 Leu Leu Gly Asn Ala Gly Thr Val Ser Asp Leu Gly Glu Asp Phe Gly
 430 435 440

cat gag ttc tac gaa gcg gag ctg aaa tac ctg gtg gat cac gaa tgg 10516
 His Glu Phe Tyr Glu Ala Glu Leu Lys Tyr Leu Val Asp His Glu Trp
 445 450 455

gtc cgc cgc gcc gac gac gcc ctg tgg cgt cgc aca aaa caa ggc atg 10564
 Val Arg Arg Ala Asp Asp Ala Leu Trp Arg Arg Thr Lys Gln Gly Met
 460 465 470 475

tgg cta aat gcg gat caa caa tct cgt gtg agt cag tgg ctg gtg gag 10612
 Trp Leu Asn Ala Asp Gln Gln Ser Arg Val Ser Gln Trp Leu Val Glu
 480 485 490

tat acg cag cag agg tta tcg ctg gcg tcg taa attaacgtaa ggtgatcagg 10665
 Tyr Thr Gln Gln Arg Leu Ser Leu Ala Ser
 495 500

tcagatttca atctggcctg agactgatga caaacacaaa actgcctgat gcgctacgct 10725

tatcaggcct acgtgggtta tgcaatatat tgaatttgca tggctcttgta g 10776

<213> Escherichia coli

Phe Val Ile Pro Trp Met Asp Glu Phe Ser Ile Ile Gly Thr Thr Asp
260 265 270

Val Glu Tyr Lys Gly Asp Pro Lys Ala Val Lys Ile Glu Glu Ser Glu
 275 280 285
 Ile Asn Tyr Leu Leu Asn Val Tyr Asn Thr His Phe Lys Lys Gln Leu
 290 295 300
 Ser Arg Asp Asp Ile Val Trp Thr Tyr Ser Gly Val Arg Pro Leu Cys
 305 310 315 320
 Asp Asp Glu Ser Asp Ser Pro Gln Ala Ile Thr Arg Asp Tyr Thr Leu
 325 330 335
 Asp Ile His Asp Glu Asn Gly Lys Ala Pro Leu Leu Ser Val Phe Gly
 340 345 350
 Gly Lys Leu Thr Thr Tyr Arg Lys Leu Ala Glu His Ala Leu Glu Lys
 355 360 365
 Leu Thr Pro Tyr Tyr Gln Gly Ile Gly Pro Ala Trp Thr Lys Glu Ser
 370 375 380
 Val Leu Pro Gly Gly Ala Ile Glu Gly Asp Arg Asp Asp Tyr Ala Ala
 385 390 395 400
 Arg Leu Arg Arg Arg Tyr Pro Phe Leu Thr Glu Ser Leu Ala Arg His
 405 410 415
 Tyr Ala Arg Thr Tyr Gly Ser Asn Ser Glu Leu Leu Leu Gly Asn Ala
 420 425 430
 Gly Thr Val Ser Asp Leu Gly Glu Asp Phe Gly His Glu Phe Tyr Glu
 435 440 445
 Ala Glu Leu Lys Tyr Leu Val Asp His Glu Trp Val Arg Arg Ala Asp
 450 455 460
 Asp Ala Leu Trp Arg Arg Thr Lys Gln Gly Met Trp Leu Asn Ala Asp
 465 470 475 480
 Gln Gln Ser Arg Val Ser Gln Trp Leu Val Glu Tyr Thr Gln Gln Arg
 485 490 495
 Leu Ser Leu Ala Ser
 500

<210> 24

<211> 15067

<212> DNA

<213> Escherichia coli

<400> 24

ataacagcaa tcaaggaaaa ggggaaaatc agcaattttc tgaaagagat gccctttccg 60

gcggcaaagg gcatcatggt aaatcagtta tagttaatct taaaaagcac cactgtatcg 120

t	a	a	a	t	g	t	c	a	t		t	c	t	t	t	t	c		t	t	a	a	t	t	a	a	t	g		a	c	a	a	g	g	t	a	a		a	t	c	a	g	g	c	g	t		t	g	g	t	c	g	t	g	t	c		1	9	2	0				
t	t	c	c	a	g	a	c	a	c	g	t		t	c	t	g	g	c	a	g	a	t	g	c	a		g	c	t	t	t	g	c	t	c	a		c	c	c	c	a	g	a	a	c	a	g		c	g	g	t	a	a	a	c	a	g		1	9	8	0				
t	t	g	a	t	t	t	t	t	c	a		g	o	g	a	c	a	c	c	g	c		t	t	a	a	c	c	a	g	g	c		a	t	g	t	c	c	t	t	c		t	c	g	c	c	a	a	c	c	a		t	a	c	c	c	a	c	g	t		2	0	4	0
a	a	t	g	c	c	g	c	t	g		t	c	a	t	c	t	g	g	c		g	g	a	t	a	t	c	c	g	c		a	c	c	g	a	g	g	g	a		g	g	g	a	a	c	t	g	a	c		c	g	t	g	g	c	g	t		2	1	0	0			
g	c	g	t	a	t	g	a	t	g		a	c	g	t	t	a	a	c	g	t		c	t	t	t	a	c	c	g	g	a		a	c	g	g	a	a	g	c		a	g	t	g	a	t	t	t	g	t		a	a	c	t	a	t	c	g	c		2	1	6	0		
g	c	o	t	t	c	a	a	t	c		c	a	t	g	t	t	t	c	o	t		t	g	a	t	g	a	c	g	t		t	t	c	g	a	a	c	t		g	t	t	g	c	a	a	c	t		g	t	t	a	c	g	t		2	2	2	0						
a	t	t	c	a	t	g	t	t	c		a	c	c	g	c	a	c	g		t	g	g	a	a	g	g	c	t	g		g	t	a	a	c	t	g	g	a		a	t	c	a	a	c	g	g	c	a		c	c	a	c	c	g	c	a	a	t		2	2	8	0		
g	c	c	a	a	a	a	t	g		t	t	g	g	t	g	t	a	g	t		c	g	a	a	t	t	g	c		c	t	g	a	a	c	c	g	g	a		a	t	a	t	c	t	g	c	c	a		c	g	c	c	a	t	c	g	g	t		2	3	4	0		
g	c	t	g	a	c	c	a	t	c		a	g	g	c	g	t	g	g	t		c	a	t	t	g	g	t	g	g	a		g	c	t	g	c	g	g	a		g	t	g	a	a	t	g	c	t	g		c	a	c	c	a	t	a	t	t	g		2	4	0	0		
g	g	t	t	g	c	g	g	t	g		a	a	a	g	a	a	c	c	g	c		t	o	c	a	g	t	g	c	t		g	c	t	g	a	c	g	a		c	t	g	t	a	a	t	c	a	c		t	g	g	c	g	g	c	a	t	a		2	4	6	0		
g	g	t	a	c	c	a	g	a		a	t	a	t	c	c	c	a	c	t		c	a	c	c	o	g	t	g	a		a	c	t	c	a	g	g	t	g	c		t	g	a	t	a	g	t	t	a	c		c	g	t	c	a	c	c	t	g		2	5	2	0		
g	g	c	t	c	a	t	t	g		t	o	c	g	a	c	g	a	t		c	g	g	a	t	t	g	c	a	g		t	c	c	g	c	a	g	a	c		a	t	g	c	c	c	c	a	c</																			


```

aatcgaaact gacaaagtgg tactggaagt accggcatca gcagacggca ttctggatgc 13860
ggttctggaa gatgaaggta caacggtaac gtctcgtcag atccttggtc gcctgctga 13920
aggcaacagc gccggtaaag aaaccagcgc caaatctgaa gagaaagcgt ccaactccgc 13980
gcaacgccag caggcgtctc tggaagagca aaacaacgat gcgttaagcc cggcgatccg 14040
tcgcctgctg gctgaacaca atctcgacgc cagcgccatt aaaggcaccg gtgtgggtgg 14100
tcgtctgact cgtgaagatg tggaaaaaca tctggcgaaa gcccggcgga aagagtctgc 14160
tccggcagcg gctgctccgg cggcgcaacc ggctctggct gcacgtagtg aaaaacgtgt 14220
cccgatgact cgcctgcgta agcgtgtggc agagcgtctg ctggaagcga aaaactccac 14280
cgccatgctg accacgttca acgaagtcaa catgaagccg attatggatc tgcgtaagca 14340
gtacggtgaa gcgtttgaaa aacgccacgg catcgcgtctg ggctttatgt cttctacgt 14400
gaaagcggtg gttgaagccc tgaaacgtta cccggaagtg aacgcttcta tcgacggcga 14460
tgacgtggtt taccacaact atttcgacgt cagcatggcg gtttctacgc cgcgcggcct 14520
ggtgacgccg gttctgctg atgtcgatac cctcggcatt gcagacatcg agaagaaaat 14580
caaagagctg gcagtcaaag gccgtgacgg caagctgacc gttgaagatc tgaccggtgg 14640
taacttcacc atcaccaacg gtggtgtggt cggttccctg atgtctacgc cgatcatcaa 14700
cccgccgagc agcgcgaattc tgggtatgca cgctatcaaa gatcgtccga tggcggtgaa 14760
tggtcagggt gagatcctgc cgatgatgta cctggcgctg tcctacgac accgtctgat 14820
cgatggtcgc gaatccgtgg gcttcctggc aacgatcaaa gagttgctgg aagatccgac 14880
gcgtctgctg ctggacgtgt agtagtttaa gtttcacctg cactgtagac cggataaggc 14940
attatgcctt tctccggcaa ttgaagcctg atgcgacgct gacgcgtctt atcaggccta 15000
cgggaccacc aatgtaggtc ggataaggcg caagcgccgc atccgacaag cgatgcctga 15060
tgtgacg                                     15067

```

<210> 25

<211> 427

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 5348-6631 of seq id 24

<400> 25

```

Met Ala Asp Thr Lys Ala Lys Leu Thr Leu Asn Gly Asp Thr Ala Val
  1             5             10            15

```



```
<400> 26
gacagcgcggt tttgggctac gccggaaaat ttgccacaac tttaccgcaa gccgcgcgctc 60
atgtacatgg aacatccttt tgccgcttca gaaatctctg gatcatgctc gcatgttgcg 120
caatctactc gcccgtcgcg tgcgcttttc cttatactga gactgagcgt cgattcacct 180
gcaaacggcg cattttttaga ataatcctga ccttggtgcg aagagaaaac atgaaaattc 240
gcgccttatt ggtagcaatg agcgtggcaa cggtactgac tggttgccag aatatggact 300
ccaacggact gctctcatca ggagcggaag cttttcaggc ttacagtttg agtgatgcgc 360
aggtgaaaac cctgagcgat caggcatgtc aggagatgga cagcaaggcg acgattgcgc 420
cagccaatag cgaatacgtc aaacgtctga caactattgc caatgcgcta ggcaacaata 480
tcaacggcca gccggtaaat tacaaagtgt atatggcgaa ggatgtgaac gcctttgcaa 540
tggtctaacg ctgtatccgc gtctatagcg ggctgatgga tatgatgacg gataacgaag 600
tcgaagcggg gatcggtcac gaaatggggc acgtggcggt aggccatgtg aaaaaaggaa 660
tgcaggtggc acttggtaca aatgcogtgc gagtagctgc ggcctctgcg ggcgggattg 720
tcggaagtgt atctcaatca caacttggtg atctgggcga gaaattagtc aattcgcaat 780
```

11 19

aagacgaaca	cgtcaaccgc	ttcgggtatca	ccgaacaggt	tgtgcatggt	gcgaggatc	2520
tcctgatatg	cgccgaccat	aaagaaaccg	agcatcggcg	gattctctgg	atcgtaactc	2580
ggcattggca	ttgtcgtggc	aataccgtca	ccatcaatat	agtggtcgat	agcaccgtca	2640
gagtcacagg	taatatccag	cagcacagcg	cgacgttcgg	gcacttgatc	cagcccttcc	2700
agcggcagaa	ccgggaacaa	ctggctcgatc	ccccatgcgt	ccggcatcga	ctggaacagc	2760
gagaagttga	cgtacatttt	gtccgccata	cgttcctgca	gctcgtcgat	aatcggacga	2820
tgagcacggt	tttgccgata	cagctgcttt	tgcacttcat	ggcacatgct	caaataaagc	2880
tgctcagccc	atgcacgttc	ttgcaggcta	aagatgccgg	aagagtagcc	gatatgaatg	2940
tcgtgcagat	ccatctgact	gtcgtgtaac	cattcacgca	gagaacggcg	agttcccggg	3000
tcgtgcatct	cctgccagggt	ttcccacatg	ctttgcagcg	cgcgcgggcg	atcttctgca	3060
ggcgcggtcg	gcaccgtgta	ttcgtttacgt	tccacgccga	tgatattaga	caccagcacg	3120
gtgtgatgcg	cagtcaccgc	acgaccgat	tcgggtgatta	ccgtcgggatg	cggcagaccg	3180
ttttcttcac	acgcctcgcc	aatcgcccag	ataatgttgt	tggcgatttc	attgaggccg	3240
tagttcaccg	aacagtcgga	ctgcgaacga	gtaccttcat	aatccacgcc	cagaccgccg	3300
ccgacgtcga	agcactgaat	attgacgccc	agcttgtgca	gttccacata	gaaacgcgcg	3360
gattcacgaa	cgctgtcgc	gatatcgoga	atattcgcca	tctgcgaacc	gaggtggaag	3420
tgcagtagtt	gcaggctgtc	gagacgcccg	gcttcacgca	gggtttcaac	cagttgcagt	3480
acctgagtcg	cagccaggcc	gaacttcgat	ttttcccgcg	cggaggactg	ccatttacct	3540
gaaccctgcg	aagccagacg	tgcacgcacg	cccagacgag	gaacgacatt	cagacgttct	3600
gcttcatcca	gcacaatggc	gattttctgac	atctttctcaa	tgaccagata	gaccttgtgc	3660
cccatcttct	cgccaattaa	tgccaggcgg	atatattcgc	ggtctttata	accgtttgag	3720
acgatgacgc	tacgggtcat	gccagcatgt	gccagtactg	ccatcaactc	ggctttggaa	3780
ccggcttcca	gacccagcgg	ttcgcccga	tgaatcaggg	actcaatcac	gcggcggtgc	3840
tggttaactt	tgatcggata	aacaagggaag	taatcgccgt	tatagccgta	ggattccctc	3900
gcacgtttga	acgcggcggt	aatggaacgc	aaacgggtgt	gcaggatctg	tgggaaacag	3960
aacagtgcag	gcagacgctg	gccctgtgct	tcacgagttt	tcactaactg	cgcgagatcg	4020
acgcgagctt	ccgggacgtc	cgggtccggg	cacacgctaa	tgtggcccag	ctcgttaacg	4080
tcatagtagt	tattgcccc	ccaggcaata	ttgtaagtac	gcagcatctt	gctggcttcc	4140
tgggagctca	ttgcaacctc	ctgcatggag	cgtagtacac	cgtgttcgcc	cgctgacgaa	4200

ggcaaacc	ca tagacat	gtc gtcagacata	gcgaacctca	aattat	tttta ttaagtgtaa	4260
aacagtt	aac gactatc	gcga gctctggaact	gcgataacaa	cccataagca	catggatttt	4320
ccagcag	tga atgctg	acgc tccaactgcg	caaccgg	ttt ctttttcata	acattattaa	4380
gcacata	aacc gaacg	taagt gtgaaag	ttc ggcgaaacca	cgagaaaact	cttg	4440
caagag	cgc cttgt	ttcag	cctcagtaac	tgtaaccagc	tcttgaatcc	4500
cgagat	gggt ata	acatcgg	caggtatgca	aagcagagat	gcagagtgcg	4560
cttcacc	aga acggt	gagac aggttaagca	gcagacaacg	gttcattatt	tcgtatcacc	4620
tccacg	gccg cctgt	taaga cgaacccaca	agccaaaact	ctgatttcaa	cccggctgga	4680
agtgg	caaca cgaaag	aaac gtcgtgtgct	ttttatttaa	gccgcgcgcc	gcgttttata	4740
ccccaca	atg gcagaaa	att gcaaaaagata	aatacgcaga	atgccggcat	tg	4800
aatttcc	agc cacgt	tttta acagaatgag	acacgattca	aaaaaaagt	gaaatagggt	4860
gaagaat	tga cctaaa	atag ccatccagat	gttaatccat	ccataccgat	taacactcag	4920
actgcc	agt ttttta	acct gcagagtcgt	ggtaggatcc	gctaccacag	aaaatccaca	4980
caacag	tttg agcta	accaa attctcttta	ggtgatatta	aatatggcaa	aacacctttt	5040
tacgtcc	gag tccgt	ctctg aagggcatcc	tgacaaaatt	gctgaccaa	tttctgatgc	5100
cgtttt	tagac gcgat	cctcg aacaggatcc	gaaagcacgc	gttgcttgcg	aaacctacgt	5160
aaaaacc	ggc atgg	ttttag ttggcggcga	aatcaccacc	agcgccctggg	tagacatcga	5220
agagat	cacc cgta	acaccg ttcgcgaaat	tggtatgtg	cattccgaca	tgggctttga	5280
cgcta	actcc tgtgc	ggttc tgagcgctat	cg	gcaaacag tctcctgaca	tcaaccagg	5340
cgttg	accgt gccgat	ccgc tggaacagg	gg cggggtgac	caggggtctga	tg	5400
cgc	aactaat gaaacc	gacg tgctgatgcc	agcacctatc	acctatgcac	accgtctggt	5460
acagc	gtcag gctga	agtgc gtaaaaacg	cactctgccg	tggtgcgcgc	cggacgcgaa	5520
aagcc	aggtg acttt	tcag	atgacgacg	caaaaatcg	tt ggtatcgatg	5580
ttcc	actcag cactct	gaag agatcgacca	gaaatcgctg	caagaagcgg	taatggaaga	5640
gatcat	caag ccaatt	ctgc ccgctgaatg	gctgacttct	gccaccaa	at tcttcac	5700
cccg	accggt cgttt	cgtta tcgggtggccc	aatgggtgac	tg	cggtctga ctgg	5760
aattat	cggt gatac	ctacg gcggcatggc	gcgtcacgg	ggcggtgcat	tctctg	5820
agatoc	atca aaagt	ggacc gttccgcagc	ctacgcagca	cg	ttatgtcg cgaaaa	5880

19 20

cggtattcac	tctccgtcgg	cgcagtat	ttt	cgccatcgcc	atgctgctga	tgtttattgt	7680
cggtttttgcc	atgagtgccg	gtccgctgat	ttgggtactg	tgctccgaaa	ttcagccgct		7740
gaaaggccgc	gattttggca	tcacctgctc	cactgccacc	aactggattg	ccaacatgat		7800
cgttggcgca	acgttcctga	ccatgctcaa	cacgctgggt	aacgccaaca	ccttctgggt		7860
gtatgcggct	ctgaacgtac	tgtttatcct	gctgacattg	tggctggtac	cggaaaccaa		7920
acacgtttcg	ctggaacata	ttgaacgtaa	tctgatgaaa	ggtcgtaaac	tgcgcgaaat		7980
aggcgcctcac	gattaatctc	cccaagcttc	ctcccatcgc	ggaggaagcc	acctcttgca		8040
gtcatctttt	cttcgctcta	tcctctgccg	ctatgaaaac	atcccgctctc	cctatcgcca		8100
tccaacaggc	cgttatgcgt	cgctcgccgg	aaaaactcgc	ccaggccaac	ctgaagctag		8160
ggcgtaacta	cccggagcca	aaactctctt	acaccacagc	cggaacctcc	gccggaacgg		8220
cctggctgga	aagctatgaa	attcgccctca	atcccgtttt	gctgttggaa	aacagtgaag		8280
cttttattga	agaagtggta	ccgcacgaac	tggcacattt	gctggtatgg	aaacatttcg		8340
gccgcgtagc	gccacatggc	aaagagtgga	agtggatgat	ggaaaacgtg	ctgggtgttc		8400
ccgcccgtcg	tacgcatcag	ttogaactgc	aatccgtgog	tgcgaacacc	ttcccctacc		8460
gctgcaagtg	ccaggagcat	cagcttaccg	tacgccgcca	taatcgcgta	gttcgtggcg		8520
aggccgtcta	tcgctgtgtt	cactgcggtg	aacagctggt	tgcgaaataa	ccatctgaac		8580
tatcaggaac	tttcctgatc	tggctgattg	cataccaaaa	cagctttcgc	tacgttgctg		8640
gctcgtttta	acacggagta	agtgatgtac	cgttatttgt	ctattgctgc	ggtgggtactg		8700
agcgcagcat	tttcggcccc	ggcgttggcc	gaaggatatca	atagtttttc	tcaggcgaaa		8760
gccgcggcgg	taaaagtcca	cgctgacgcg	cccgttacgt	tttattgcgg	atgtaaaatt		8820
aactggcagg	gcaaaaaaag	cgttgttgat	ctgcaatcgt	goggctatca	ggtgcgcaaa		8880
aatgaaaacc	gcgccagccg	cgtagagtgg	gaacatgtcg	ttcccgccctg	gcagttccgt		8940
caccagcgcc	agtgctggca	ggacggtgga	cgtaaaaaact	gcgctaaaga	tcgggtctat		9000
cgcaagatgg	aaagcgatat	gcataacctg	cagccgtcag	tcggtgaggt	gaatggcgat		9060
cgcggaact	ttatgtacag	ccagtggaat	ggcggtgaa	gccagtacgg	tcaatgcgcc		9120
atgaaggtcg	atttcaaaga	aaaagctgcc	gaaccaccag	cgcgtgacg	cggtgccatt		9180
gcgcgcacct	acttctatat	gcgcgaccaa	tacaacctga	cactctctcg	ccagcaaacg		9240
cagctgttca	acgcatggaa	caagatgtat	ccggttaccg	actgggagtg	cgagcgcgat		9300

gaacgcatcg cgaaggtgca gggcaatcat aaccggtatg tgcaacgcgc ttgccaggcg 9360
 cgaaagagct aacctacact agcgggattc tttttgttaa cccctacccc acgcgtagaa 9420
 ccgctgtggg agacgacgcg gatttttaac tatgcgtatc ccccgcatit atcatcctga 9480
 accactgacc agccattctc acatcgcgct ttgcgaagat gccgccaacc atatcgggcg 9540
 cgtactgcgc atggggcccg ggcaggcggt gcaattgttt gacggtagca accagggtctt 9600
 tgacgccgaa attaccagcg ccagcaaaaa aagcgtggaa gtgaaggtgc tggaaggcca 9660
 gatcgacgat cggaatctc cgctgcatat tcacctcggt caggtgatgt cgcgtggtga 9720
 aaaaatggaa ttactatcc agaaatcgat cgaactcggt gtaagcctca ttacgccact 9780
 tttttctgag cgctgcggcg ttaaactgga tagtgaacgt ctgaacaaga agcttcagca 9840
 gtggcagaag attgcaattg ctgcctgtga gcagtgtggt cgtaaccggg tgccggaaat 9900
 ccgtccagcg atggatctgg aagcctggtg tgcagagcag gatgaaggac tgaaactgaa 9960
 tcttcacccg cgcgccagta acagcatcaa tacgttgccg ttaccggttg aacgcgtccg 10020
 cctgctgatt ggcccggaa gcggtttatc ggcagatgaa attgccatga ctgcccgcta 10080
 tcaatttact gatatcctgt tgggacctcg cgttttgcgt acagagacaa ctgcgctcac 10140
 cgccattacc gcgctacaag tacgatttgg cgatttgggc taacggagaa gaata atg 10198
 Met
 1
 atc aag ctc ggc atc gtg atg gac ccc atc gca aac atc aac atc aag 10246
 Ile Lys Leu Gly Ile Val Met Asp Pro Ile Ala Asn Ile Asn Ile Lys
 5 10 15
 aaa gat tcc agt ttt gct atg ttg ctg gaa gca cag cgt cgt ggt tac 10294
 Lys Asp Ser Ser Phe Ala Met Leu Leu Glu Ala Gln Arg Arg Gly Tyr
 20 25 30
 gaa ctt cac tat atg gag atg ggc gat ctg tat ctg atc aat ggt gaa 10342
 Glu Leu His Tyr Met Glu Met Gly Asp Leu Tyr Leu Ile Asn Gly Glu
 35 40 45
 gcc cgc gcc cat acc cgc acg ctg aac gtg aag cag aac tac gaa gag 10390
 Ala Arg Ala His Thr Arg Thr Leu Asn Val Lys Gln Asn Tyr Glu Glu
 50 55 60 65
 tgg ttt tcg ttc gtc ggt gaa cag gat ctg ccg ctg gcc gat ctc gat 10438
 Trp Phe Ser Phe Val Gly Glu Gln Asp Leu Pro Leu Ala Asp Leu Asp
 70 75 80
 gtg atc ctg atg cgt aaa gac ccg ccg ttt gat acc gag ttt atc tac 10486
 Val Ile Leu Met Arg Lys Asp Pro Phe Asp Thr Glu Phe Ile Tyr
 85 90 95
 gcg acc tat att ctg gaa cgt gcc gaa gag aaa ggg acg ctg atc gtt 10534

Ala Thr Tyr Ile Leu Glu Arg Ala Glu Glu Lys Gly Thr Leu Ile Val	
100 105 110	
aac aag ccg cag agc ctg cgc gac tgt aac gag aaa ctg ttt acc gcc	10582
Asn Lys Pro Gln Ser Leu Arg Asp Cys Asn Glu Lys Leu Phe Thr Ala	
115 120 125	
tgg ttc tct gac tta acg cca gaa acg ctg gtt acg cgc aat aaa gcg	10630
Trp Phe Ser Asp Leu Thr Pro Glu Thr Leu Val Thr Arg Asn Lys Ala	
130 135 140 145	
cag cta aaa gcg ttc tgg gag aaa cac agc gac atc att ctt aag ccg	10678
Gln Leu Lys Ala Phe Trp Glu Lys His Ser Asp Ile Ile Leu Lys Pro	
150 155 160	
ctg gac ggt atg ggc ggc ggc tgc att ttc cgc gtg aaa gaa ggc gat	10726
Leu Asp Gly Met Gly Gly Ala Ser Ile Phe Arg Val Lys Glu Gly Asp	
165 170 175	
cca aac ctc ggc gtg att gcc gaa acc ctg act gag cat ggc act cgc	10774
Pro Asn Leu Gly Val Ile Ala Glu Thr Leu Thr Glu His Gly Thr Arg	
180 185 190	
tac tgc atg gcg caa aat tac ctg cca gcc att aaa gat ggc gac aaa	10822
Tyr Cys Met Ala Gln Asn Tyr Leu Pro Ala Ile Lys Asp Gly Asp Lys	
195 200 205	
cgc gtg ctg gtg gtg gat ggc gag ccg gta ccg tac tgc ctg gcg cgt	10870
Arg Val Leu Val Val Asp Gly Glu Pro Val Pro Tyr Cys Leu Ala Arg	
210 215 220 225	
att ccg cag ggg ggc gaa acc cgt ggc aat ctg gct gcc ggt ggt cgc	10918
Ile Pro Gln Gly Gly Glu Thr Arg Gly Asn Leu Ala Ala Gly Gly Arg	
230 235 240	
ggt gaa cct cgt ccg ctg acg gaa agt gac tgg aaa atc gcc cgt cag	10966
Gly Glu Pro Arg Pro Leu Thr Glu Ser Asp Trp Lys Ile Ala Arg Gln	
245 250 255	
atc ggg ccg acg ctg aaa gaa aaa ggg ctg att ttt gtt ggt ctg gat	11014
Ile Gly Pro Thr Leu Lys Glu Lys Gly Leu Ile Phe Val Gly Leu Asp	
260 265 270	
atc atc ggc gac cgt ctg act gaa att aac gtc acc agc cca acc tgt	11062
Ile Ile Gly Asp Arg Leu Thr Glu Ile Asn Val Thr Ser Pro Thr Cys	
275 280 285	
att cgt gag att gaa gca gag ttt ccg gtg tgc atc acc gga atg tta	11110
Ile Arg Glu Ile Glu Ala Glu Phe Pro Val Ser Ile Thr Gly Met Leu	
290 295 300 305	
atg gat gcc atc gaa gca cgt tta cag cag cag taa cccaccttag	11156
Met Asp Ala Ile Glu Ala Arg Leu Gln Gln	
310 315	
cgagaaggat ctcggttgaga ctctgagtga cagcgccctt ctttccacgc atactgggcg	11216

100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 295 300 305 310 315

ctgttgcttt tttgaaccag gaaacagaac ctctgacaat gaatttacag catcactttc 11276
 ttattgccat gcttgctctc caggatccga ttttccgtcg ttccgtgggc tacatttgcg 11336
 aacataatac caatgggtgca atgggggatca tcgtcaacaa gccgctggaa aatctcaaaa 11396
 ttgaagggat tctggaaaag ctgaagatca cgccggagcc gcgtgatgaa tcaatccgtc 11456
 tggataaacc ggttatgctc ggcggtccgc tggtgaaga tcgcggggtt attttgcata 11516
 ctccgccctc caattttgct tccagcattc gcatttcaga caacacggta atgaccactt 11576
 cccgcgatgt gctggaaacg ctccggcaccg ataaacaacc gtctgacgta ttggtggctc 11636
 tgggttatgc ctccgtggag aaaggtcaac tggaacaaga aattctcgat aacgcgtggc 11696
 taacggcccc ggcagatctg aatattctgt tcaaaacgcc gattgccgac cgctggcgcg 11756
 agggcgcaaa actgattggt gtggatattc tcaccatgcc tgggtgtggca ggacacgcct 11816
 gatgagtgga accttactcg ccttcgactt cggcaccaaa agcattggcg tagcggtcgg 11876
 ccaacgcatt accggcaccg ctccgccctt gcttgcaatt aaagcacagg acggtacgcc 11936
 ggactggaac attatcgagc gtttactgaa agagtggcag ccggacgaaa tcatcgtcgg 11996
 tttgcgcgtg aatatggacg gcaccgagca accattgact gccagagcgc gtaaatttgc 12056
 caaccgtatt catggccgtt tcggtgttga agtaaagctc catgacgagc gtcttagcac 12116
 tgtggaagcc cgttccggtc tgtttgaaca gggcggctat cgggcgctca acaaaggcaa 12176
 agttgactct gcctctgcgg ttattattct cgaaagctat ttcgagcagg gatattaagg 12236
 cgatttaaac gcctggcgga gtgtaaataa tatcatcgcg tcttattgcc ggatgcggcg 12296
 tgaacacctt atccagcaca catctggcag cggctatagg tctgataaga cgcgttag 12354

<210> 27

<211> 316

<212> PRT

<213> Escherichia coli

<400> 27

Met	Ile	Lys	Leu	Gly	Ile	Val	Met	Asp	Pro	Ile	Ala	Asn	Ile	Asn	Ile
1				5					10					15	

Lys	Lys	Asp	Ser	Ser	Phe	Ala	Met	Leu	Leu	Glu	Ala	Gln	Arg	Arg	Gly
			20					25					30		

Tyr	Glu	Leu	His	Tyr	Met	Glu	Met	Gly	Asp	Leu	Tyr	Leu	Ile	Asn	Gly
		35					40					45			

Glu	Ala	Arg	Ala	His	Thr	Arg	Thr	Leu	Asn	Val	Lys	Gln	Asn	Tyr	Glu
	50						55					60			

Glu Trp Phe Ser Phe Val Gly Glu Gln Asp Leu Pro Leu Ala Asp Leu
 65 70 75 80
 Asp Val Ile Leu Met Arg Lys Asp Pro Pro Phe Asp Thr Glu Phe Ile
 85 90 95
 Tyr Ala Thr Tyr Ile Leu Glu Arg Ala Glu Glu Lys Gly Thr Leu Ile
 100 105 110
 Val Asn Lys Pro Gln Ser Leu Arg Asp Cys Asn Glu Lys Leu Phe Thr
 115 120 125
 Ala Trp Phe Ser Asp Leu Thr Pro Glu Thr Leu Val Thr Arg Asn Lys
 130 135 140
 Ala Gln Leu Lys Ala Phe Trp Glu Lys His Ser Asp Ile Ile Leu Lys
 145 150 155 160
 Pro Leu Asp Gly Met Gly Gly Ala Ser Ile Phe Arg Val Lys Glu Gly
 165 170 175
 Asp Pro Asn Leu Gly Val Ile Ala Glu Thr Leu Thr Glu His Gly Thr
 180 185 190
 Arg Tyr Cys Met Ala Gln Asn Tyr Leu Pro Ala Ile Lys Asp Gly Asp
 195 200 205
 Lys Arg Val Leu Val Val Asp Gly Glu Pro Val Pro Tyr Cys Leu Ala
 210 215 220
 Arg Ile Pro Gln Gly Gly Glu Thr Arg Gly Asn Leu Ala Ala Gly Gly
 225 230 235 240
 Arg Gly Glu Pro Arg Pro Leu Thr Glu Ser Asp Trp Lys Ile Ala Arg
 245 250 255
 Gln Ile Gly Pro Thr Leu Lys Glu Lys Gly Leu Ile Phe Val Gly Leu
 260 265 270
 Asp Ile Ile Gly Asp Arg Leu Thr Glu Ile Asn Val Thr Ser Pro Thr
 275 280 285
 Cys Ile Arg Glu Ile Glu Ala Glu Phe Pro Val Ser Ile Thr Gly Met
 290 295 300
 Leu Met Asp Ala Ile Glu Ala Arg Leu Gln Gln Gln
 305 310 315

<210> 28

<211> 11574

<212> DNA

<213> Escherichia coli

<400> 28

ataaccctga ttaatgaatt attacgttta tcatgttaatt tcatcattat tacatcatca 60

tcctataatt cttgaagata aaaaaccctc tgtagtaaca gagggttttg ttcattcata 1860
 gtgcaggggc aaatcattcc cactcaatgg tagctggcgg cttgccgctg atgtcataca 1920
 ccacgcggga aataccgttc acttcattga taatgcgggt ggaaacgcga ccgaggaaat 1980
 cgtacggcag atgcgcccag tgtgcgggtca taaagtcgat ggtttcgaca gcacgcagag 2040
 agacaacca gtcatactta cgaccatcgc ccattacgcc aacggaacgt accggcagga 2100
 acacagtga cgcctggctg actttgtcgt acaggctcgc tttacgcagt tcttcaatga 2160
 agatggcgct agcacggcgc agcaggtcac agtactcttt cttaacttca ccagaacac 2220
 gaacgccaag gcctgggtccc gggaacgggt gacggtacag catgtcgtac ggcaggccca 2280
 gctccagacc aatcttacgc acttcgtctt tgaacagctc tttcagcgg tcaaccaggc 2340
 ccatcttcat ctctttcggc aggccgcca cgttgtggtg agatttgatg acgtgtgctt 2400
 taccggttgc agacgcgcga gattcgataa cgtcagggtg gatggtgccc tgcgccagcc 2460
 acttcacgtc tccagtttc agcgtctctt catcgaatac ttcaacgaaa acgcgaccga 2520
 tgattttacg ttttgcttc ggatcgtttt cgccagccag cgctgacagg aagcgatctt 2580
 ctgccggtac gtgaacaatg ttaagaccaa agtgatcgcc aaacatatcc agaacctgct 2640
 ctgcttcggt gaggcgcagc aggccgttgt cgacgaatac gcaagtcagg tttttaccga 2700
 tagcgcggtg cagcagcatt gcggttacgg aggaatccac accaccagag aggccgagga 2760
 tgactttatc gtgcctacc tgcctcgga tgcgagctac agcatcgctg ataattttcg 2820
 ctggcggtcca cagggttca cactggcaga tatcacgcac aaaacgctcc agcatgcgca 2880
 taccctggcg ggtatgagtc acttcgggt ggaactgtac gccatagaag cgtttttctt 2940
 cgttagccat aatggcaaac gggcagcttt cgggtgctggc tacggtgatg aagtcggacg 3000
 gaatagcggg aactttatcg ccgtggtcga tccagacatc gagcagcggg ttaccgtctg 3060
 cggtcagcgc atcttcgata ccgcgaacca gtgcgctgtc gtttacgact tcaacctgcg 3120
 cgtagccaaa ttcacgttcg ttagaggctt caacgtgacc gcccaactgc attgccatgg 3180
 tctgcatgcc atagcaaacg ccgaataccg gtacgcctgc ttcaaagaca tactgcggcg 3240
 cacgcggact gttttcttca gtagtacttt ccgggcgcgc ggaaagaata atgccgcttg 3300
 gattgaagtc acgaatttgt gttctgtca catcccacgc ccacagttcg cagtaaacac 3360
 ccagctcacg cacgcggcgc gcaaccagtt gagtgtactg agaaccgaag tccagaatga 3420
 ggatgcgatg cttatgaatg ttttcgctca ttgacgctta ttccgaggca agtgaaacag 3480

11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

cagactcacc cagcaccaca gcaacgcggg caccgccattt atcagcacgg gcaaactgtt 10380
 tcttaaagtt gccgcccggg tgggttggtca tcaatttcac gcccggtaat tcatcacgca 10440
 gacgctcagc taatgccata gccgcagatt gtgtatcagc acctgaagcc accaggtata 10500
 tatcgacaac aggatcgggt ttaaattccg gattaacggc ctgtactaac aatacaagac 10560
 gttcgaggcc catagcaaaa ccgacagccg gtgttgacag accgcccagt tgttcacaa 10620
 gaccgtcata acgaccgcct gcacacacgg tgccctggga gccgagactg ttagtcaccc 10680
 actcgaaaac ggtacggttg tagtaatcca gaccacgcac cagacgctgg tttacggtgt 10740
 aagcgatccc cgcgctctcc agcagtttgc acagaccggc aaaatgctca cgagattcct 10800
 cgtccagata gtcacctaat gccggagcgt cgttgagaag cgcctgcact tccggatttt 10860
 ttgaatccag cacgcgcagc gggttagtgt acatgcggcg tttgcagtct tcgtccagct 10920
 tttctttatg ctgctcaagg aatgccacca gcgcacgcg gtaattggcg cgtgcttcca 10980
 gcgaaccgat agagttcagc tcaagagtta cgtgctcggg aatacccagc gcgcgccacc 11040
 agcgggcagt gagcataatc agttcagcgt cgatatccgg acctgcaga ccgaaaactt 11100
 cgcagcccaa ctgatggaac tgacgataac gccctttctg cggacgctcg tgacggaaca 11160
 tcggcccgat ataccacaga cgctgttctt gattgtacag aagaccatgc tcgatgccgg 11220
 cgcgtacaca gcccgccgtc ccttcagggc gcagagtcag gctgtcgcca ttgcgatcct 11280
 caaagggtgta catctctttt tcaaccacgt cggtgacttc accaatcgca cgtttgaata 11340
 gcggggtctg ctctacaatc ggcaagcgga tttcactgta accgtagctg ccgagcacgt 11400
 ttttcagtgt gccttcaatg cgctgocaga tggccgtttc gccaggcagg taatcgttca 11460
 tgccgcgaat ggcttgaatg ttttttgcca cgtttattct ctttctgaat ataaaaatga 11520
 accctcaacg cttccctcaa tgtttcggga gccatgcggg ttcaatcata cacg 11574

<210> 29

<211> 488

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 3520-4986 of seq id 28

<400> 29

Met	Leu	Arg	Ile	Ala	Lys	Glu	Ala	Leu	Thr	Phe	Asp	Asp	Val	Leu	Leu
1				5					10					15	

Val	Pro	Ala	His	Ser	Thr	Val	Leu	Pro	Asn	Thr	Ala	Asp	Leu	Ser	Thr
			20					25					30		

Gln Leu Thr Lys Thr Ile Arg Leu Asn Ile Pro Met Leu Ser Ala Ala
 35 40 45
 Met Asp Thr Val Thr Glu Ala Arg Leu Ala Ile Ala Leu Ala Gln Glu
 50 55 60
 Gly Gly Ile Gly Phe Ile His Lys Asn Met Ser Ile Glu Arg Gln Ala
 65 70 75 80
 Glu Glu Val Arg Arg Val Lys Lys His Glu Ser Gly Val Val Thr Asp
 85 90 95
 Pro Gln Thr Val Leu Pro Thr Thr Thr Leu Arg Glu Val Lys Glu Leu
 100 105 110
 Thr Glu Arg Asn Gly Phe Ala Gly Tyr Pro Val Val Thr Glu Glu Asn
 115 120 125
 Glu Leu Val Gly Ile Ile Thr Gly Arg Asp Val Arg Phe Val Thr Asp
 130 135 140
 Leu Asn Gln Pro Val Ser Val Tyr Met Thr Pro Lys Glu Arg Leu Val
 145 150 155 160
 Thr Val Arg Glu Gly Glu Ala Arg Glu Val Val Leu Ala Lys Met His
 165 170 175
 Glu Lys Arg Val Glu Lys Ala Leu Val Val Asp Asp Glu Phe His Leu
 180 185 190
 Ile Gly Met Ile Thr Val Lys Asp Phe Gln Lys Ala Glu Arg Lys Pro
 195 200 205
 Asn Ala Cys Lys Asp Glu Gln Gly Arg Leu Arg Val Gly Ala Ala Val
 210 215 220
 Gly Ala Gly Ala Gly Asn Glu Glu Arg Val Asp Ala Leu Val Ala Ala
 225 230 235 240
 Gly Val Asp Val Leu Leu Ile Asp Ser Ser His Gly His Ser Glu Gly
 245 250 255
 Val Leu Glr Arg Ile Arg Glu Thr Arg Ala Lys Tyr Pro Asp Leu Gln
 260 265 270
 Ile Ile Gly Gly Asn Val Ala Thr Ala Ala Gly Ala Arg Ala Leu Ala
 275 280 285
 Glu Ala Gly Cys Ser Ala Val Lys Val Gly Ile Gly Pro Gly Ser Ile
 290 295 300
 Cys Thr Thr Arg Ile Val Thr Gly Val Gly Val Pro Gln Ile Thr Ala
 305 310 315 320
 Val Ala Asp Ala Val Glu Ala Leu Glu Gly Thr Gly Ile Pro Val Ile
 325 330 335

Ala Asp Gly Gly Ile Arg Phe Ser Gly Asp Ile Ala Lys Ala Ile Ala
340 345 350

Ala Gly Ala Ser Ala Val Met Val Gly Ser Met Leu Ala Gly Thr Glu
355 360 365

Glu Ser Pro Gly Glu Ile Glu Leu Tyr Gln Gly Arg Ser Tyr Lys Ser
370 375 380

Tyr Arg Gly Met Gly Ser Leu Gly Ala Met Ser Lys Gly Ser Ser Asp
385 390 395 400

Arg Tyr Phe Gln Ser Asp Asn Ala Ala Asp Lys Leu Val Pro Glu Gly
405 410 415

Ile Glu Gly Arg Val Ala Tyr Lys Gly Arg Leu Lys Glu Ile Ile His
420 425 430

Gln Gln Met Gly Gly Leu Arg Ser Cys Met Gly Leu Thr Gly Cys Gly
435 440 445

Thr Ile Asp Glu Leu Arg Thr Lys Ala Glu Phe Val Arg Ile Ser Gly
450 455 460

Ala Gly Ile Gln Glu Ser His Val His Asp Val Thr Ile Thr Lys Glu
465 470 475 480

Ser Pro Asn Tyr Arg Leu Gly Ser
485

<210> 30

<211> 11204

<212> DNA

<213> Escherichia coli

<400> 30

ttgaggcggc gctggctcat tcccctcagc ccgaagggtg gaggggaatg cccgaattaa 60
ccgtcagttc gggattatct acgcgttagt ttttcagat cggcttcaat ctgctgatc 120
ttattggtta cgactgactc caggtgacgt aagtcgtcga ggatcttacg cttaagatca 180
acttgcgtgc ggtcacgctg gcagatttga tcaagctcat caatgatata ccgtagattc 240
gggctgattt cctggacttc ttataaccc tgaccacac catcagcgac gaccgtttta 300
cgctgacgag gatatttaaa cttaacgctc ttggcgaaaa actcgctttt gtctttctgg 360
aaatagattt tcagaatata gttgttggct tctgcccga ggctgtaacg atcaatttct 420
tcaggattgg taatacccag acttttcaga ttgtcgtaca tagcgttacc tcaaaatgag 480
tcagtaaatt gtgcttattt tagcatttgg cctggcccgc ccggctcgac tgtgatcgca 540
gaaagccttt ttcttcaga ctctatcat ggcgtaaaaa tcaaaaaatt acctgcttta 600

cagaaaccgc gtgtttgttca ttaacaatgt aatcattaca gatgcgatcc agctcgccgg 5760
 tgctgacgcc cggtttaaca tacgggttca tcatctccag cacttcggca gccagtcggc 5820
 cagcgacgcg cattttttcg atatcttctg gggctttgat tgagatagcc attaatctg 5880
 tccatcagcg tcgggtgatac cgacaatata tatgtaagt cgtcaatgg tatcacaccc 5940
 gggcaaattg agaatcattc tgaatttcgc caaacgtgcc actgaaggtt ttctataata 6000
 gaaaattcga cgtctgatgc tgtacacagc gccacaatt attggtgtcc acgacgtatt 6060
 tgtggtataa agcgcgcggc acttccgac catttcgtat acacagactg gacggaagcg 6120
 acaatctcac tttgtgtaac aacacacagc tatcggcaca tattccgggg tgccctttgg 6180
 ggtcggtaat atgggatacg tggaggcata accccaactt ttatatagag gttttaatca 6240
 tggcaactgt ttccatgcgc gacatgctca aggctggtgt tcacttcggt caccagaccc 6300
 gttactggaa cccgaaaatg aagccgttca tcttcggtgc gcgtaacaaa gttcacatca 6360
 tcaacctga gaaaactgta ccgatgttca acgaagctct ggctgaactg aacaagattg 6420
 cttctcgcaa aggtaaaatc cttttcgttg gtactaaacg cgctgcaagc gaagcggatg 6480
 aagacgtgc tctgagctgc gaccagttct tcgtgaacca tcgctggctg ggcggtatgc 6540
 tgactaactg gaaaaccgtt cgtcagttca tcaaactct gaaagacctg gaaactcagt 6600
 ctgagacgg tactttcgac aagctgacca agaaagaagc gctgatgcgc actcgtgagc 6660
 tggagaaaact gaaaaacagc ctgggcggta tcaaagacat gggcggctct cgggacgctc 6720
 tgtttgtaat cgatgctgac cacgaacaca ttgctatcaa agaagcaaac aacctgggta 6780
 ttccggtatt tgctatcgtt gataccaact ctgatccgga cgggtgtgac ttcggtatcc 6840
 cgggtaacga cgacgcaatc cgtgctgtga cactgtacct gggcgtggtt gctgcaaccg 6900
 tacgtgaagg ccgttctcag gatctggctt ccaggcgga agaaagcttc gtagaagctg 6960
 agtaataagg cttgataact ccccaaaaat agttcgagtt gcagaaaggc ggcaagctcg 7020
 agaattcccc ggagcttaca tcagtaagt accgggatga gcgagcgaag ataacgcac 7080
 tgccggcgca aatatgaagg gggagagccc ttatagacca ggtagtacac gtttggttag 7140
 ggggcctgca tatggcccc tttttcactt ttatatctgt gcggtttaat gccgggcaga 7200
 tcacatctcc gaggatttta gaatggctga aattaccgca tccctggtaa aagagctgcg 7260
 tgagcgtact ggcgcaggca tgatggattg caaaaaagca ctgactgaag ctaacggcga 7320
 catcgagctg gcaatcgaac acatgcgtaa gtccggtgct attaaagcag cgaaaaaagc 7380
 aggcaacgtt gctgctgac gcgtgatcaa aaccaaaatc gacggcaact acggcatcat 7440

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 11000 12000 13000 14000 15000 16000 17000 18000 19000 20000 21000 22000 23000 24000 25000 26000 27000 28000 29000 30000 31000 32000 33000 34000 35000 36000 37000 38000 39000 40000 41000 42000 43000 44000 45000 46000 47000 48000 49000 50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000 64000 65000 66000 67000 68000 69000 70000 71000 72000 73000 74000 75000 76000 77000 78000 79000 80000 81000 82000 83000 84000 85000 86000 87000 88000 89000 90000 91000 92000 93000 94000 95000 96000 97000 98000 99000 100000

cgaacaaggc caggcagcga cgacagcatt gaatgccgca aacgaaatca ccgttgctgc 10920
 ttttcttgcg caacaaatcc gctttaogga tatcgctgcg ttgaatttat ccgtactgga 10980
 aaaaatggat atgcgcgaac cacaatgtgt ggacgatgtg ttatctgttg atgcgaacgc 11040
 gcgtgaagtc gccagaaaag aggtgatgcg tctcgcaagc tgaggataat ccggctacag 11100
 agagtcgcg tatttgtttag cgtagggcctt cagtgatata gtctgcgcca tctgatcgta 11160
 agtagttggc tttataaggt cagatatgcc gtgggttttac acgg 11204

<210> 31

<211> 264

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 5078-5872 of seq id 30

<400> 31

Met Ala Ile Ser Ile Lys Thr Pro Glu Asp Ile Glu Lys Met Arg Val
 1 5 10 15

Ala Gly Arg Leu Ala Ala Glu Val Leu Glu Met Ile Glu Pro Tyr Val
 20 25 30

Lys Pro Gly Val Ser Thr Gly Glu Leu Asp Arg Ile Cys Asn Asp Tyr
 35 40 45

Ile Val Asn Glu Gln His Ala Val Ser Ala Cys Leu Gly Tyr His Gly
 50 55 60

Tyr Pro Lys Ser Val Cys Ile Ser Ile Asn Glu Val Val Cys His Gly
 65 70 75 80

Ile Pro Asp Asp Ala Lys Leu Leu Lys Asp Gly Asp Ile Val Asn Ile
 85 90 95

Asp Val Thr Val Ile Lys Asp Gly Phe His Gly Asp Thr Ser Lys Met
 100 105 110

Phe Ile Val Gly Lys Pro Thr Ile Met Gly Glu Arg Leu Cys Arg Ile
 115 120 125

Thr Gln Glu Ser Leu Tyr Leu Ala Leu Arg Met Val Lys Pro Gly Ile
 130 135 140

Asn Leu Arg Glu Ile Gly Ala Ala Ile Gln Lys Phe Val Glu Ala Glu
 145 150 155 160

Gly Phe Ser Val Val Arg Glu Tyr Cys Gly His Gly Ile Gly Arg Gly
 165 170 175

Phe His Glu Glu Pro Gln Val Leu His Tyr Asp Ser Arg Glu Thr Asn

180	185	190
Val Val Leu Lys Pro Gly Met Thr Phe Thr Ile Glu Pro Met Val Asn		
195	200	205
Ala Gly Lys Lys Glu Ile Arg Thr Met Lys Asp Gly Trp Thr Val Lys		
210	215	220
Thr Lys Asp Arg Ser Leu Ser Ala Gln Tyr Glu His Thr Ile Val Val		
225	230	235
Thr Asp Asn Gly Cys Glu Ile Leu Thr Leu Arg Lys Asp Asp Thr Ile		
	245	250
		255
Pro Ala Ile Ile Ser His Asp Glu		
260		

<210> 32

<211> 14820

<212> DNA

<213> Escherichia coli

<400> 32

cactttgtta acaacttta ctactcttta atgcagtatt aaagattaat cggttaacaaa 60
gtgagctggt atgactgata aaaccattgc gttttcgcta ctgactctgg cccccattcc 120
cgaaggttct tcagcgcgag aagcattctc ccactctctc gatctcgccc gtctgggtga 180
aaagcgcggc tatcatcgct actggctggc agaacaccac aatatgactg gcattgccag 240
tgctgccacg tcggtattga tcggctatct ggccggcgaat accaccacgc tgcactctggg 300
gtctggcggc gtgatgttgc ctaaccactc accgttggtc attgcagaac agttcggcac 360
gcttaataca ctctatccgg ggccgaatcga tttggggctg ggtcgtgctc cgggtagtga 420
ccaacggaca atgatggcgc tacgtcgta tatgagcggc gatattgata atttcccccg 480
cgatgtggcg gagctggtgg actggtttga cgcgcgcgat cccaatccgc atgtgcgccc 540
ggtaccaggc tatggcgaga aaatccccgt gtggttgta ggctccagcc tttacagcgc 600
gcaactggcg gcgcagcttg gtctgccgtt tgogtttgcc tcacacttcg cgcggatat 660
gctgttccag gcgctgcac tttatcgcag caacttcaaa ccgtcagcac ggctggaaaa 720
accatacgcg atggtgtgca tcaatattat cgcgcgcgac agcaaccgcg acgctgaatt 780
tctgtttacc tcaatgcagc aagcctttgt gaagctgcgc cgtggcgaaa ccgggcaact 840
gccgccgcgc attcaaaata tggatcagtt ctggtcaccg tctgagcagt atggcgtgca 900
gcaggcgtg agtatgtcgt tggtaggtga taaagcgaaa gtgcgtcatg gcttgcatc 960
gatcctgcgc gaaaccgacg ccgatgagat tatggtcaac gggcagattt tcgaccacca 1020

ggcgcggtg cattcgttg agctggcgat ggatgttaag gaagagttgt tgggatagt 1080
 tgtcttaacg cgggaagcct tatccgagct ggcaacgctg tcctacatag acctgataag 1140
 cgaagcgcat caggcattgt gtaggcagca gaaatgtcgg ataaggcacc gctgattact 1200
 gatacaccgg cagtaaatta aagctcgata aaatatgcac cagtgcgttg ccgacgcca 1260
 acaccagaat cagcgcaatc atcggcttgc caccacagac gcggaatttc gggctgcca 1320
 agcgtttacg cgatgcacgg gctaacagcg ccggaacaat tgccgcccag atggtagccg 1380
 ctaaaccagc ataaccaatg gcgtacagga atccgttcgg gaacaacagc cccccacaa 1440
 ctggcggggc aaaggtcagc aatgccgttt tcaagcggcc cacagccgag tcgtcgaaac 1500
 caaacagatc tgccagatag tcaaacaaac ccagcgttac gccaggaac gaactcgcta 1560
 ccgcaaagtt tgagaacacg accagcagca gatccagact acggctgttc agtacgcgc 1620
 ttaacgcctg taccagcaca tcaatattac cgcccttctc tgcaataccg ataaactccg 1680
 gacgcgggat gttaccatc gtcgccagca accagatggc atacagcgc agcgccatca 1740
 gcgtaccgta caccagacat ttcacgatgg ttttcggatc tttgccgtaa tacttcatca 1800
 ggcttggcac gttaccgtga taaccaaacg atgccagaca gaacggcagg gtcacaaaca 1860
 gatacgggtg ataagacgca ttgctttcgg cgacgttgaa caatgtcgca ggctgcacat 1920
 gcccagcag gctaccaaag gtgaggaaga aggtaatgac tttcgcccc agcacaatcg 1980
 ctgtcatgag actgacggct ttagtgctca accacaccac aaacgctacc agcaatgcaa 2040
 aacaaaaacc cgccgccgt gccgggacgt ttagtgacat ctctgcgaag gtgtgatgca 2100
 gaatcgaacc actggcagaa atataggcat aggtcaggat atagagcaca aaggcaatgg 2160
 aaatgccgtt gaccacgttc cagcctttgc ccagcaaac tttggtgatg gtgtcaaaac 2220
 togaaccgat tctgtaattc aggttagctt ccagaatcat caagccggaa tgcagcatac 2280
 agaaccagg aaagatcagc gccgccattg accagaaaaa ccacgcccc gacatgacca 2340
 ctggcagaga aaacatccct gcgccaataa tgggtccgcc gataatcacc acgcccga 2400
 gcagcgacgg tgacgtttgg gtgggtggtta gtgttgccat gagggcttct ctccagtga 2460
 aaatagtgcg actgcgttgt tatgcattgc actgtaccag tacacgagta caaaagacag 2520
 aaaaaagcc ccgatggtaa aaatcggggc tgtatatatt attttacaga ttgtgttcgc 2580
 tgttcagcga tgattacgca tcaccaccga aacgacgac accggtagaa tcatcacgac 2640
 gcggagcgcg gccttcacga cgttcgccgc taaaacgac accatcacca cggccacctt 2700

taaatcgggg ctttatataa ctgaacccta taaccgcaac tgcggtctgg agcactttcc 14760
 agaaggattt tttcaaattcc cactacgaag gccgaagtct tcacagtata tttgaaaaag 14820

<210> 33

<211> 414

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 1196-2440 of seq id 32

<400> 33

Met	Ala	Thr	Leu	Thr	Thr	Thr	Gln	Thr	Ser	Pro	Ser	Leu	Leu	Gly	Gly	1	5	10	15
Val	Val	Ile	Ile	Gly	Gly	Thr	Ile	Ile	Gly	Ala	Gly	Met	Phe	Ser	Leu	20	25	30	
Pro	Val	Val	Met	Ser	Gly	Ala	Trp	Phe	Phe	Trp	Ser	Met	Ala	Ala	Leu	35	40	45	
Ile	Phe	Thr	Trp	Phe	Cys	Met	Leu	His	Ser	Gly	Leu	Met	Ile	Leu	Glu	50	55	60	
Ala	Asn	Leu	Asn	Tyr	Arg	Ile	Gly	Ser	Ser	Phe	Asp	Thr	Ile	Thr	Lys	65	70	75	80
Asp	Leu	Leu	Gly	Lys	Gly	Trp	Asn	Val	Val	Asn	Gly	Ile	Ser	Ile	Ala	85	90	95	
Phe	Val	Leu	Tyr	Ile	Leu	Thr	Tyr	Ala	Tyr	Ile	Ser	Ala	Ser	Gly	Ser	100	105	110	
Ile	Leu	His	His	Thr	Phe	Ala	Glu	Met	Ser	Leu	Asn	Val	Pro	Ala	Arg	115	120	125	
Ala	Ala	Gly	Phe	Gly	Phe	Ala	Leu	Leu	Val	Ala	Phe	Val	Val	Trp	Leu	130	135	140	
Ser	Thr	Lys	Ala	Val	Ser	Arg	Met	Thr	Ala	Ile	Val	Leu	Gly	Ala	Lys	145	150	155	160
Val	Ile	Thr	Phe	Phe	Leu	Thr	Phe	Gly	Ser	Leu	Leu	Gly	His	Val	Gln	165	170	175	
Pro	Ala	Thr	Leu	Phe	Asn	Val	Ala	Glu	Ser	Asn	Ala	Ser	Tyr	Ala	Pro	180	185	190	
Tyr	Leu	Leu	Met	Thr	Leu	Pro	Phe	Cys	Leu	Ala	Ser	Phe	Gly	Tyr	His	195	200	205	
Gly	Asn	Val	Pro	Ser	Leu	Met	Lys	Tyr	Tyr	Gly	Lys	Asp	Pro	Lys	Thr	210	215	220	

Escherichia coli, complement of position 1196-2440 of seq id 32, amino acid sequence, 1-220

Ile Val Lys Cys Leu Val Tyr Gly Thr Leu Met Ala Leu Ala Leu Tyr
 225 230 235 240
 Thr Ile Trp Leu Leu Ala Thr Met Gly Asn Ile Pro Arg Pro Glu Phe
 245 250 255
 Ile Gly Ile Ala Glu Lys Gly Gly Asn Ile Asp Val Leu Val Gln Ala
 260 265 270
 Leu Ser Gly Val Leu Asn Ser Arg Ser Leu Asp Leu Leu Leu Val Val
 275 280 285
 Phe Ser Asn Phe Ala Val Ala Ser Ser Phe Leu Gly Val Thr Leu Gly
 290 295 300
 Leu Phe Asp Tyr Leu Ala Asp Leu Phe Gly Phe Asp Asp Ser Ala Val
 305 310 315 320
 Gly Arg Leu Lys Thr Ala Leu Leu Thr Phe Ala Pro Pro Val Val Gly
 325 330 335
 Gly Leu Leu Phe Pro Asn Gly Phe Leu Tyr Ala Ile Gly Tyr Ala Gly
 340 345 350
 Leu Ala Ala Thr Ile Trp Ala Ala Ile Val Pro Ala Leu Leu Ala Arg
 355 360 365
 Ala Ser Arg Lys Arg Phe Gly Ser Pro Lys Phe Arg Val Trp Gly Gly
 370 375 380
 Lys Pro Met Ile Ala Leu Ile Leu Val Phe Gly Val Gly Asn Ala Leu
 385 390 395 400
 Val His Ile Leu Ser Ser Phe Asn Leu Leu Pro Val Tyr Gln
 405 410

<210> 34

<211> 10731

<212> DNA

<213> Escherichia coli

<400> 34

ctacatccga caaaacgatg tcaaccatcc gaaaccgctc tcattcattc gatgagagcg 60
 gtttttttaa ttactgctta aatgcaccog ccagagagcg aatatcattg ccggttggcg 120
 actgatgaag tcgcagacca aactcttcga caatcgcaaa tatgtgatcg aatatatcag 180
 cctgaatgct ttcatattcc agccacacca cgggtgtagt aaacgcgtag atctcgagcg 240
 gtaaaccgtt atcacctgga gccagttggc gtaccattaa ggtcatatct ttacgaatcc 300
 gcggatggtt acgcagatat tcgttcagat aggcacgaaa ggttccaata ttggtcattc 360
 ggcgcagatt taataccgac tccgtagaac cttgctggcg attccactca ttaatttcct 420

gatggcggct	ggttaaataa	ggctttaaca	aatgcgcttt	attcagacgt	tgcatttcgt	480
cttcatcaag	aaaacgaata	ctggtgacat	caatactgat	actgcgctta	atacgtcgcc	540
cgccagatgc	tgacatcccg	ctccagtttt	taaaggagtc	agaaaccaga	gaccagggtg	600
gaatagtgg	aatggtattg	tcccagttac	gcactttgac	ggtggttaac	ccaatatcga	660
tcaccgcgcc	atccgcgcgc	tatttcggca	tctccagcca	gtcgcccagt	ttcagcatat	720
cgttcgcgga	aagctgaata	cctgccacca	gaccaagaat	cggatcttta	aataccaaca	780
tcagcacggc	agccattgca	ccaagaccgc	tgatcagaat	cgctggcgac	tgaccaatca	840
gcagcgagat	catcaaaatg	ccgaccagaa	tcgcgcgcgt	cagtttaatc	ccctgaaata	900
tccctttcag	cggtaactga	gatgctgcgc	ggaattttctg	cgccagattc	aaaataacat	960
ccagcaacga	gaagactgaa	agcagcgcgt	acatcatgat	ccacaactgc	gcgcaggtag	1020
tcagaatata	tgccgcttcg	gtgccttttt	gcagccagaa	taccgcctga	atattgacga	1080
taatcccctg	cagggtaaaa	gctaaacgg	ggaagagttt	attctgggta	atgatttgca	1140
accaaagccg	tgaactggcg	atggcacgtt	tttcgaagg	ccgcagtacc	acccaatgca	1200
aaataatatg	caccacgacg	gcggtcagaa	aaataatacc	gaaaatcatc	accatcgagg	1260
tggtgtgatc	gatctcaata	cccgcataat	cttcaacctg	ggatattaaa	tcctgcataa	1320
cgtctccttt	atacaacagc	agcctatgat	gacggctgaa	acagggttat	gcaaatcagg	1380
agaatctgag	aggaaatagc	cgggcagatg	ccgggcaaga	gagaattaca	cttcggttaa	1440
ggtgatgttt	tgcggcagac	gagatttcgg	cagcgtagcg	ttaaaatctt	caacgctgtg	1500
atgacctacc	ggaacaacca	ccagactgg	gtagcctttc	tctttcagac	caaattctgc	1560
atcgaggatg	gcggcgtcaa	aaccttcgat	gggtaccgcg	tccagacca	gagccgccac	1620
gccgagcagg	aagttaccga	cgttgagata	aacctgtttt	gccatccact	ctgcatcatc	1680
atgcagatct	ttacggtgca	tatcagcgaa	gaacttgcca	cctttatcgt	tcgcggcttt	1740
cgtttccggc	gtggcaaagc	ggccatcggc	atcttctcgg	tcaacaacca	gcttcagcca	1800
gacatcgtcc	atcgcggttt	ttgcacagaa	caccacgacg	tgcgaggcat	caagcatttt	1860
acgctcgttg	aacacgtaat	taccggcagc	ggatttgcca	acacgcgctt	taccttcttc	1920
cgtgctggca	acaataaaat	gccacggctg	ggagttgg	ctggatgggc	tgtattgcag	1980
tagcgttttg	atctgctcgg	cctgttcgg	ggtaagtttt	ttgctggcat	caaatgcctt	2040
agtggaatga	cgctttaagg	cgacagaaat	gatatccata	aagactccat	gtgaaagtaa	2100
ttttgcgtgc	cagcagatta	caaggttcaa	cgagaaatgg	taagcgagaa	aaatgcgcta	2160

ctaacatcat taccggaaga tgaatattca gcagagcaag tggctgattg ttaccgtctg 5640
 cgatggcaaa ttgaactggc ttttaagcgg ctcaaaagtt tgctgcacct ggatgctttg 5700
 cgtgcaaagg aacctgaact cgcgaaagcg tggatatattg ctaatctact cgccgcattt 5760
 ttaattgacg acataatcca gccatcgctg gatttcccc ccagaagtgc cggatccgaa 5820
 aagaagaact aactcgttgt ggagaataac aaaaatggtc atctggagct tacaggtggc 5880
 cattcgtggg acagtatccc tgacagccta caaaacgcaa ttgaagaacg cgaggcatcg 5940
 tottaacgag gcaccgaggg gtcgcattct tcagatgggt caacccttaa gttagcgctt 6000
 atgggagtaa tccccgata tccggttgct aggtcaggat ggtaaggcac ctgctttaca 6060
 ctttcgcccg tggtcagtga tggctgcggg cgaatcgta cagatgttgt caattaatcg 6120
 tgttggcaca gcgttatgac tatcttttct tttatctgcc agtgcacagc aaacatctca 6180
 ttctcacgat gaatgatgac ctgctgttta ttccagctaa ttatctgata gtccagaaaa 6240
 cctgcacag tttggatctc acttgcccta aatgcgctct ctttggcgga aaatgccagt 6300
 gtcagcgcca gagaaaaggc taaaccgcag tctgcgagtc gtcctgttgc cgctgggtga 6360
 ataatgttgt ctgtcaattc tcttgcgggt tgtacagaaa aaatttcttc tatatcaatg 6420
 ccaatcgggt gacgagatac cacggcta at gcgtagtcc cacagtgggt aatactgccg 6480
 tatacctccg caggccagac aggttggcgt agctcgccga ttgcgggcac acatttatag 6540
 ccatattccc gcaaagcata aacagcagcg atccgtccgg ctaa atgctc tgttttacgt 6600
 ttacgtccag cgtgttgacg ttgtgcgtag tgcggcagcc agagtaa atc ctgctcacia 6660
 aaattcgccg gatcgaactc aacaaaatgc agcgtatgtc cggcaaaggg gagggaggta 6720
 tgcgtagttt tcatatcgac catattcgag actgatgaca aacgcaaaac tgcctgatgc 6780
 gctacgctta tcaggcctac atggtcctgc aatatattga attggcaaga tttttgtagg 6840
 cgggataagg cgttcacgcc gcatccggca tgaacgacgc gcactttgtc aacaatctga 6900
 cgtttagcatc agaagtgggt gtttacgctc atataccacg tacgtcccgg ctgcttatag 6960
 gtatacgccc cggcaccggc gatatagttg gccctgcc aatcgccgt ggtctgggca 7020
 ttaccgcac gccacaaacg tttgtcgaac agattgtcca cgccgccgt cagactgaca 7080
 ttcttcgtca catcccaggt cgcgctcagg ccaacaatgc tgtaaggact aatttctttg 7140
 gtttcgggtc caaccgctgg ctgaccttta tagttgtact tcttcggctg ctgcttgccg 7200
 taccaggtga aggtcgtttg catcgacaaa tcttcccggt cctgccagct cagcgttgag 7260

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (469)..(2118)

<400> 36

```

acgggtgggc gcagagcgat acttcgctac tattttcacc cagaagtgct ccaccacttg 60
cgaaacgccc gactgcgaac gtttctggtg acaaccagc ggattcagcc cctgtagccg 120
atgatgaacg tggccagccg ttcaatcacc tcggcgatgc accccctcag gtgttatcac 180
aggactgggt cctccaacac cgttacttgg gcaacgcgcc tcttctggcc tgcgctagcg 240
caggtagtac atttataaat aaaggggtgag cggggcggtt gtcaacgatg gggcatgacg 300
gatttttcat ccactcctgg cggtcagtag ttcagctaataaatgcttca ctgcgctaag 360
ggtttacact caacattacg ctaacggcac taaaaccatc acatttttct gtgactggcg 420
ctacaatctt ccaaagtcac aattctcaaa atcagaagag tattgcta atg aaa aac 477
                                     Met Lys Asn
                                     1

atc aat cca acg cag acc gct gcc tgg cag gca cta cag aaa cac ttc 525
Ile Asn Pro Thr Gln Thr Ala Ala Trp Gln Ala Leu Gln Lys His Phe
      5                      10                      15

gat gaa atg aaa gac gtt acg atc gcc gat ctt ttt gct aaa gac ggc 573
Asp Glu Met Lys Asp Val Thr Ile Ala Asp Leu Phe Ala Lys Asp Gly
      20                      25                      30                      35

gat cgt ttt tct aag ttc tcc gca acc ttc gac gat cag atg ctg gtg 621
Asp Arg Phe Ser Lys Phe Ser Ala Thr Phe Asp Asp Gln Met Leu Val
                      40                      45                      50

gat tac tcc aaa aac cgc atc act gaa gag acg ctg gcg aaa tta cag 669
Asp Tyr Ser Lys Asn Arg Ile Thr Glu Glu Thr Leu Ala Lys Leu Gln
                      55                      60                      65

gat ctg gcg aaa gag tgc gat ctg gcg ggc gcg att aag tcg atg ttc 717
Asp Leu Ala Lys Glu Cys Asp Leu Ala Gly Ala Ile Lys Ser Met Phe
                      70                      75                      80

tct ggc gag aag atc aac cgc act gaa aac cgc gcc gtg ctg cac gta 765
Ser Gly Glu Lys Ile Asn Arg Thr Glu Asn Arg Ala Val Leu His Val
                      85                      90                      95

gcg ctg cgt aac cgt agc aat acc ccg att ttg gtt gat ggc aaa gac 813
Ala Leu Arg Asn Arg Ser Asn Thr Pro Ile Leu Val Asp Gly Lys Asp
      100                      105                      110                      115

gta atg ccg gaa gtc aac gcg gtg ctg gag aag atg aaa acc ttc tca 861
Val Met Pro Glu Val Asn Ala Val Leu Glu Lys Met Lys Thr Phe Ser
                      120                      125                      130

```

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

tcc aac ggt aag tat gtt gac cgt aac ggt aac gtt gtg gat tac cag 1581
 Ser Asn Gly Lys Tyr Val Asp Arg Asn Gly Asn Val Val Asp Tyr Gln
 360 365 370

act ggc ccg att atc tgg ggt gaa cca ggc act aac ggt cag cac gcg 1629
 Thr Gly Pro Ile Ile Trp Gly Glu Pro Gly Thr Asn Gly Gln His Ala
 375 380 385

ttc tac cag ctg atc cac cag gga acc aaa atg gta ccg tgc gat ttc 1677
 Phe Tyr Gln Leu Ile His Gln Gly Thr Lys Met Val Pro Cys Asp Phe
 390 395 400

atc gct ccg gct atc acc cat aac ccg ctc tct gat cat cac cag aaa 1725
 Ile Ala Pro Ala Ile Thr His Asn Pro Leu Ser Asp His His Gln Lys
 405 410 415

ctg ctg tct aac ttc ttc gcc cag acc gaa gcg ctg gcg ttt ggt aaa 1773
 Leu Leu Ser Asn Phe Phe Ala Gln Thr Glu Ala Leu Ala Phe Gly Lys
 420 425 430 435

tcc cgc gaa gtg gtt gag cag gaa tat cgt gat cag ggt aaa gat ccg 1821
 Ser Arg Glu Val Val Glu Gln Glu Tyr Arg Asp Gln Gly Lys Asp Pro
 440 445 450

gca acg ctt gac tac gtg gtg ccg ttc aaa gta ttc gaa ggt aac cgc 1869
 Ala Thr Leu Asp Tyr Val Val Pro Phe Lys Val Phe Glu Gly Asn Arg
 455 460 465

ccg acc aac tcc atc ctg ctg cgt gaa atc act ccg ttc agc ctg ggt 1917
 Pro Thr Asn Ser Ile Leu Leu Arg Glu Ile Thr Pro Phe Ser Leu Gly
 470 475 480

gcg ttg att gcg ctg tat gag cac aaa atc ttt act cag ggc gtg atc 1965
 Ala Leu Ile Ala Leu Tyr Glu His Lys Ile Phe Thr Gln Gly Val Ile
 485 490 495

ctg aac atc ttc acc ttc gac cag tgg ggc gtg gaa ctg ggt aaa cag 2013
 Leu Asn Ile Phe Thr Phe Asp Gln Trp Gly Val Glu Leu Gly Lys Gln
 500 505 510 515

ctg gcg aac cgt att ctg cca gag ctg aaa gat gat aaa gaa atc agc 2061
 Leu Ala Asn Arg Ile Leu Pro Glu Leu Lys Asp Asp Lys Glu Ile Ser
 520 525 530

agc cac gat agc tcg acc aat ggt ctg att aac cgc tat aaa gcg tgg 2109
 Ser His Asp Ser Ser Thr Asn Gly Leu Ile Asn Arg Tyr Lys Ala Trp
 535 540 545

cgc ggt taa tcacgtcga tatgtaggcc ggataaggcg ttcacgcgcg 2158
 Arg Gly
 550

atccggcaac cgatgcctga tgcgacgcgg tcgctgtctta tcaggcctac aggtcgatgc 2218

cgatatgtac atcgtattcg gcaattaata catagcacga ttgattaaat aaccttaata 2278

acaatgccga cgttatgtcg gcattttttt atcagataaa tccccttgtc tgtaatttaa 2338

1581
 1629
 1677
 1725
 1773
 1821
 1869
 1917
 1965
 2013
 2061
 2109
 2158
 2218
 2278
 2338

cggaatcat accgtgaggt taatcctaaa atagattttt aatcgttggt tatttcggaa 2398
 aatacgcaga ttaattgctt ttgtttttat tttaagttaa tgatttttat tgttatttaa 2458
 atataagttg aaacttatat ttgatattca ttccaattat cctaaaacgc catcgcta 2518
 tccccgcgc gtaattcgca tgctttagtt gtgtatactc gatccccgcc gaaatgtttt 2578
 tgggtaaate tccattcatt caatgaaggg aaattgttat gaaaaaagtt ctgtatggca 2638
 tttttgccat atctgcgctt gcggcgactt ctgcgtgggc tgcacctgta caggtgggcg 2698
 aagcggcagg gtccgcagca acgtcggttt cggcggggag ttctccgcg accagcgtca 2758
 gcaccgtaag ctccggcggtg ggtgtcgcgc ttgcggcaac cggtgccggt gatggttcta 2818
 ataccgggac caccacaacc acgaccacca gtaccagta ataaagtatg tatcccaaaa 2878
 ataattcgag tcattgcac tgtggctaga agtatgaagg gattaacat aaccacactc 2938
 cgggtgtggtt attctgcccc tctggagaag agtcgtgaag cgacctgcac tcattcttat 2998
 ctgcctgtta ttacaggcct gttcagccac gactaaagag ctgggcaatt cactgtggga 3058
 cagtctgttc ggcacgccag gcgtacagct gacggatgat gatattcaaa atatgcccta 3118
 cgccagccag tacatgcagc ttaatggcgg gccgcagtta tttgtggtgc tggccttcgc 3178
 tgaagacgga caacaaaaat gggtcactca ggatcaggct actctcgta cccaacatgg 3238
 ccgtctggtg aagactctgc tcggcggcga caacctgatt gaagtgaata accttgctgc 3298
 cgacctgctg attaaaccgg cacaatcgt tgatggcgca agctggacgc gcacgatggg 3358
 ctggaccgag taccagcagg tacgtacgc caccgcacgc tcagtcttca aatgggatgg 3418
 caccgatacc gtcaaagtcg gcagcgatga aaccccggtt cgcgtgctgg acgaagaagt 3478
 ctccaccgac caggcgcgct ggcataaccg ctattggatc gacagcgaag ggcaaattcg 3538
 ccagtcggaa cagtatctcg gcgcggatta ttttcgggtg aaaaccactc tcatcaaggc 3598
 ggcaaaacaa tgattaaaca aactattgtc gcgttgcttt tgagtgtggg agcgtcatcg 3658
 gtcttcgcgg caggaaccgt caagggttgc agcaatggca gcagtgaggc caaacgcta 3718
 acgggcgag agcatttaat cgatctggta ggccaaccgc ggctggcaaa cagctggtgg 3778
 cccggtgcgg tgattagcga agagctggca acggcggcag cattgcgtca gcagcaggcg 3838
 ttgctgacac ggctggcaga acaggcgca gattccagcg ccgacgatgc cgctgcgatt 3898
 aacgccttac gccagcaaat tcaggcgttg aaagtgcgg gcaggcaaaa aatcaatctt 3958
 gatcccgata tcgtccgctg tgccgaacgc ggtaaccgcg cgttgccagg caactacacg 4018

ettcccactg caccagacac gccagaacca tgccgaccgc caccgttaaa aagacagtga 10918
 tcagcgagaa caccacggtc cagacgaaaa tggcgaggaa cggtttctga atgccttcgt 10978
 cggtaaagac gcgggtaaag tttttccagc cgggtggtcac ggtgtaaccg gggcttagct 11038
 tttcatcacc ccagttgccg tcggcggtta tggactggta aaagccaatt tggttattcg 11098
 gacgatattt cagccgctc tgattattcg tcaacgtgcc gtcaccgtcg agtgtgtaga 11158
 gcggctgcgt gccagaaaac tggcgcaggg agctcatcat cactttgttg ccatccggca 11218
 gaatggcggg aatgtcactc agcgcctgac gattctgggt aatcacgcgc agattcgcgc 11278
 gttcgccttc gggctgggcg gtcgtttctt tcagttgcag tttttgctcg ccgccaaatt 11338
 taaaagcgtc ggagaggtaa tttttgccg tttcgcgctc gctgagcgcc agttgccact 11398
 catcgcccgc cgggtaaaga ccaaagttat aggttttgcc tgcttgccag gagcgatcta 11458
 acaacacttc ctgcgcacgt tcaaaagtca gctggtagt gctgctgtag ttggtgaagg 11518
 caatggcgat ggtgcagacc agagggaaga ggacgaataa tccattcca gccattccc 11578
 ggtaaacata gcgccaggcg taggctttac gattggcgaa aatatacagc cccgctgaac 11638
 tcaatatcag cgtggtaatg gcgaacaggt attccccttg tgcgtacatt aaaacaacaa 11698
 ggtaaccac cagcaggccg agcagaccta gcaactgacca tttcagcgcg tcgctttgcc 11758
 accaatgttt ctttttaatg acatccatgg ggttcttctt cattccagga cggataaggc 11818
 tttcacgcct taccgacaa caactgcctg atgcgacgt gacgcgtctt atcaggccta 11878
 catacgtttc ggtttttag gccggacaag gcgttcacgc cgcattccggc atttcacagc 11938
 attacttggg gatacgagtc tgccgctctt tcagggttc atcgacagtc tgacgaccgc 11998
 tggcggcggt gatcaccgca gtacgcacgg cataccagaa agcggacatc tgcgggatgt 12058
 tcggcatgat ttcaccttc tgggcgtttt ccatggtggc ggcaatacgt ggatctttcg 12118
 ccaactcttc ctcgtaagac ttcagcgcta cggcaccag cggtttgtct ttattaaccg 12178
 cttccagacc ttcacagtc agcagatagt tttcgaggaa ctctttcgcc agctctttgt 12238
 tcggactggc ggcgttaata cctgcgtca gcacgccaac gaacggtttg gatggttgac 12298
 ccttgaaggc cggcagtacc gttacacat aattcacttt gctggtgtcg atgttgacc 12358
 atgcccacgg gcggttgatg gtcacgctg tttcgccttt attaaaggca gcttctgcga 12418
 tggagtaatc ggtgtctgca ttcattgtgt tgtttttaat caggtaacc aggaaggta 12478
 gacccgcttt cgcgccagcg ttatccagc ccacgtcttt aatgtcgtac ttgccgtttt 12538
 catacttgaa cgcataacc ccgtcagcag caatcagcgg ccagggtgaag tacggttctt 12598

10918 10978 11038 11098 11158 11218 11278 11338 11398 11458 11518 11578 11638 11698 11758 11818 11878 11938 11998 12058 12118 12178 12238 12298 12358 12418 12478 12538 12598

gcaggttgaa catcagcgcg ctcttacctt tcgctttcag ttctttatcc agcgccggga 12658
 tctcttccca ggtttttggc ggggtcggca gcagatcttt gttataaatc agcgataacg 12718
 ctccaacagc gatcgggtaa gcaatcagct tgccgttgta acgtacggca tcccaggtaa 12778
 acggatacag cttgtcctgg aacgctttgt ccgggggtgat ttcagccaac aggccagatt 12838
 gagcgtagcc accaaagcgg tcgtgtgccc agaagataat gtcagggcca tcgccagttg 12898
 ccgcaacctg tgggaatttc tcttcagtt tatccgatg ctcaacggtg actttaattc 12958
 cggatatctt ctogaatttc ttaccgactt cagcgagacc gttatagcct ttatcgccgt 13018
 taatccagat taccagttta ccttcttoga ttttggcgag agccgaggcg gaaaacatca 13078
 tcgtcgtaa tgcggataat gcgaggatgc gtgcacctgt ttttattttc ataactatg 13138
 gtcttgttg gtgaagtgt cgtgaaaaca cctaaacgga ctctagtctt tttatacggc 13198
 aacctcttc catctcctt gccctacgc cccacgctcg ctttgtgtga tctctgttac 13258
 agaattggcg gtaatgtgga gatgcgcaca taaaatogcc acgatttttg caagcaacat 13318
 caggaattc cttacatgac ctcggtttag ttacagaag ccgtgttctc atcctccgc 13378
 ctctccccc ataaaaaagc cagggggtgg aggatttaag ccctctctg atgacgcata 13438
 gtcagcccat catgaatgtt gctgtcgatg acaggttggt acaaaggag aagggcattg 13498
 cgagcgta gctgcaaat gtaacgaaag cctggggcga ggtcgtggt tgcgaaagata 13558
 tcaatctcga tatccatgaa ggtgaattcg tgggtttgt cggaacctct ggctgcggta 13618
 aatcgacttt actgcgcag attgccgggc ttgagacgat caccagcggc gacctgttca 13678
 tcggtgagaa acggatgaat gacactccgc cagcagaacg cggcgttggt atggtgttct 13738
 agtcttacgc gctctatccc cacctgtcag tagcagaaaa catgtcattt ggctgaaac 13798
 tggctggcgc aaaaaaagag gtgattaacc aacgcgttaa ccagggtggc gaagtgtac 13858
 aactggcgca tttgctgat cgcaaaccga aagcgctctc cgtggtcag cgtcagcgtg 13918
 tggcgattgg ccgtacgtg gtggccgagc caagcgatt tttgctgat gaaccgtct 13978
 ccaacctcga tgctgcactg cgtgtgcaaa tgcgtatcga aatctccgt ctgcataaac 14038
 gcctgggccc cacaatgatt tacgtcacc acgatcaggt cgaagcgatg acgctggccg 14098
 aaaaaatcgt ggtgctggac gccggtcgcg tggcgaggt tgggaaaccg ctggagctgt 14158
 accactatcc ggcagaccgt tttgtcgccg gatttatcgg ttcgcaaag atgaacttcc 14218
 tgccggtaaa agtgaccgcc accgcaatcg atcaagtga ggtggagctg ccgatgccaa 14278

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

atcgtcagca agtctggctg ccagttgaaa gccgtgatgt ccagggttga gccaatatgt 14338
 cgctgggtat tcgcccggaa catctactgc cgagtgatat cgtgacgtc atccttgagg 14398
 gtgaagttca ggtcgtcgag caactcggca acgaaactca aatccatata cagatccctt 14458
 ccattcgtca aaacctggtg taccgccaga acgacgtggt gttggtagaa gaaggtgcca 14518
 cattcgctat cggcctgccg ccagagcggt gccatctggt ccgtgaggat ggcactgcat 14578
 gtcgtcgact gcataaggag ccgggcgttt aagcacccca caaaacacac aaagcctgtc 14638
 acaggtgatg tgaaaaaaga aaagcaatga ctgagg 14674

<210> 37

<211> 549

<212> PRT

<213> Escherichia coli

<400> 37

Met	Lys	Asn	Ile	Asn	Pro	Thr	Gln	Thr	Ala	Ala	Trp	Gln	Ala	Leu	Gln
1				5					10					15	
Lys	His	Phe	Asp	Glu	Met	Lys	Asp	Val	Thr	Ile	Ala	Asp	Leu	Phe	Ala
			20					25					30		
Lys	Asp	Gly	Asp	Arg	Phe	Ser	Lys	Phe	Ser	Ala	Thr	Phe	Asp	Asp	Gln
		35					40					45			
Met	Leu	Val	Asp	Tyr	Ser	Lys	Asn	Arg	Ile	Thr	Glu	Glu	Thr	Leu	Ala
	50					55					60				
Lys	Leu	Gln	Asp	Leu	Ala	Lys	Glu	Cys	Asp	Leu	Ala	Gly	Ala	Ile	Lys
65				70					75					80	
Ser	Met	Phe	Ser	Gly	Glu	Lys	Ile	Asn	Arg	Thr	Glu	Asn	Arg	Ala	Val
				85				90						95	
Leu	His	Val	Ala	Leu	Arg	Asn	Arg	Ser	Asn	Thr	Pro	Ile	Leu	Val	Asp
			100					105					110		
Gly	Lys	Asp	Val	Met	Pro	Glu	Val	Asn	Ala	Val	Leu	Glu	Lys	Met	Lys
		115					120					125			
Thr	Phe	Ser	Glu	Ala	Ile	Ile	Ser	Gly	Glu	Trp	Lys	Gly	Tyr	Thr	Gly
			130				135				140				
Lys	Ala	Ile	Thr	Asp	Val	Val	Asn	Ile	Gly	Ile	Gly	Gly	Ser	Asp	Leu
145					150				155					160	
Gly	Pro	Tyr	Met	Val	Thr	Glu	Ala	Leu	Arg	Pro	Tyr	Lys	Asn	His	Leu
			165					170						175	
Asn	Met	His	Phe	Val	Ser	Asn	Val	Asp	Gly	Thr	His	Ile	Ala	Glu	Val
			180					185					190		

19 20

Gly Val Ile Leu Asn Ile Phe Thr Phe Asp Gln Trp Gly Val Glu Leu
500 505 510

Gly Lys Gln Leu Ala Asn Arg Ile Leu Pro Glu Leu Lys Asp Asp Lys
515 520 525

Glu Ile Ser Ser His Asp Ser Ser Thr Asn Gly Leu Ile Asn Arg Tyr
530 535 540

Lys Ala Trp Arg Gly
545

<210> 38

<211> 11692

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (529) .. (1632)

<400> 38

aaagcgttgc gcctttgttg tatcgtcagt tcagggtaaa atagatttcc gttaaccacc 60
tggtcaggac gccgtatgca ttgcccatc tgtttcgccg tggacactaa ggtaattgac 120
tctcgtctcg cgggcgaggg ttcattccgta cgccgccgtc ggcagtgtct ggtgtgtaat 180
gaacgtttca ccacctttga agtggcggag ctggttatgc cgcgtgttgt aaaaagcaac 240
gacgtgcgtg aaccgtttta tgaagagaaa ttgcgtagcg gaatgctgcg ggcgctggaa 300
aaacgtccgg tgagttccga tgacgtcgaa atggcaatca atcatattaa atcgcagctg 360
cgcgccaccg gtgagcgcgga agtgccgagc aagatgattg gcaatctggt gatggagcaa 420
ttgaaaaagc tcgataaagt cgcctatatc cgttttgcct ctgtctaccg cagtttcgaa 480
gatatcaaag aatttggcga agagatcgcg cgcttgagg actaagcc gtg cag gac 537
Val Gln Asp
1

gag tat tac atg gcg cgg gcg cta aag ctg gcg caa cga gga cgt ttt 585
Glu Tyr Tyr Met Ala Arg Ala Leu Lys Leu Ala Gln Arg Gly Arg Phe
5 10 15

acc acg cat ccc aac ccg aat gtc ggg tgc gtc att gtc aaa gat ggc 633
Thr Thr His Pro Asn Pro Asn Val Gly Cys Val Ile Val Lys Asp Gly
20 25 30 35

gaa att gtc ggt gaa ggt tac cac caa cgt gcg ggt gaa cca cat gcc 681
Glu Ile Val Gly Glu Gly Tyr His Gln Arg Ala Gly Glu Pro His Ala
40 45 50

gaa gta cac gcg ttg cgt atg gcg ggt gaa aaa gcc aaa ggt gcg acc 729
Glu Val His Ala Leu Arg Met Ala Gly Glu Lys Ala Lys Gly Ala Thr

55	60	65	
gcc tat gtc aca ctc gaa ccc tgt agc cat cat ggt cgt acg cca ccg Ala Tyr Val Thr Leu Glu Pro Cys Ser His His Gly Arg Thr Pro Pro 70 75 80			777
tgc tgt gac gca ctc atc gcc gct ggc gta gcg cgc gtg gtt gcc tcg Cys Cys Asp Ala Leu Ile Ala Ala Gly Val Ala Arg Val Val Ala Ser 85 90 95			825
atg caa gat cct aac ccg cag gtc gct ggg cgt gga ctt tac cgt ctg Met Gln Asp Pro Asn Pro Gln Val Ala Gly Arg Gly Leu Tyr Arg Leu 100 105 110 115			873
caa cag gct ggc att gac gtc agc cac ggc ctg atg atg agt gaa gcc Gln Gln Ala Gly Ile Asp Val Ser His Gly Leu Met Met Ser Glu Ala 120 125 130			921
gag caa ttg aat aaa ggc ttt ctc aag cgg atg cgc acc ggc ttt cct Glu Gln Leu Asn Lys Gly Phe Leu Lys Arg Met Arg Thr Gly Phe Pro 135 140 145			969
tat att cag tta aaa ctt ggc gca tcg ctt gat ggt cgc acg gcg atg Tyr Ile Gln Leu Lys Leu Gly Ala Ser Leu Asp Gly Arg Thr Ala Met 150 155 160			1017
gcg agc ggc gaa agc cag tgg atc act tcg ccc cag gcg cgg cgt gat Ala Ser Gly Glu Ser Gln Trp Ile Thr Ser Pro Gln Ala Arg Arg Asp 165 170 175			1065
gta caa cta ctg cgc gcg caa agt cat gcc att tta acc agc agc gcc Val Gln Leu Leu Arg Ala Gln Ser His Ala Ile Leu Thr Ser Ser Ala 180 185 190 195			1113
acg gtg ctg gcg gat gat cct gcc tta acg gtg cgt tgg tct gaa ctg Thr Val Leu Ala Asp Asp Pro Ala Leu Thr Val Arg Trp Ser Glu Leu 200 205 210			1161
gat gaa caa act cag gcg ctc tat ccg caa caa aat ctc cgt cag ccg Asp Glu Gln Thr Gln Ala Leu Tyr Pro Gln Gln Asn Leu Arg Gln Pro 215 220 225			1209
ata cgt att gtg att gat agc caa aat cgc gtg acg ccg gta cat cgc Ile Arg Ile Val Ile Asp Ser Gln Asn Arg Val Thr Pro Val His Arg 230 235 240			1257
att gtg cag cag ccc ggc gaa acc tgg ttc gcg cgt acg cag gaa gat Ile Val Gln Gln Pro Gly Glu Thr Trp Phe Ala Arg Thr Gln Glu Asp 245 250 255			1305
tct cgt gag tgg ccg gaa acg gtg cgt acc ttg ctg att cca gag cat Ser Arg Glu Trp Pro Glu Thr Val Arg Thr Leu Leu Ile Pro Glu His 260 265 270 275			1353
aaa ggt cat ctg gat ctg gtt gta ctg atg atg caa ctg ggt aaa cag Lys Gly His Leu Asp Leu Val Val Leu Met Met Gln Leu Gly Lys Gln 280 285 290			1401

caa att aac agc atc tgg gtg gaa gcg ggg cca acg ctc gct ggc gca 1449
 Gln Ile Asn Ser Ile Trp Val Glu Ala Gly Pro Thr Leu Ala Gly Ala
 295 300 305

ttg ctg cag gcg ggt tta gtc gat gag ctg att gtc tat atc gca cct 1497
 Leu Leu Gln Ala Gly Leu Val Asp Glu Leu Ile Val Tyr Ile Ala Pro
 310 315 320

aaa cta tta ggc agc gac gcc cgc gga tta tgc acg ctg cca ggg ctt 1545
 Lys Leu Leu Gly Ser Asp Ala Arg Gly Leu Cys Thr Leu Pro Gly Leu
 325 330 335

gag aaa tta gcc gac gcc ccc caa ttt aaa ttc aaa gag ata cgt cat 1593
 Glu Lys Leu Ala Asp Ala Pro Gln Phe Lys Phe Lys Glu Ile Arg His
 340 345 350 355

gta ggc ccg gat gtt tgc ctg cat tta gtg ggt gca tga tctccccgct 1642
 Val Gly Pro Asp Val Cys Leu His Leu Val Gly Ala
 360 365

cgaaagggaa gcagcgcacg aaatattatg ctaaaatccg ccccccctgcg gggccatact 1702
 cgaaccogaa ggaagaaaat gaacattatt gaagctaacg ttgctacccc ggacgctcgc 1762
 gtcgccatca ccacgcgcg tttcaacaac tttatcaatg acagcctgct ggaagggtgca 1822
 attgacgcac tgaaacgtat cggtcaggta aaagatgaaa acattaccgt tgtttgggtg 1882
 cctggtgcct atgagctgcc gctggcggcg ggtgcactgg ctaaaaccgg taaatacgac 1942
 gcggtgattg cgctgggtac gggtattcgt ggtggcactg cccactttga atatgtcgtc 2002
 ggtggtgcaa gcaacggcct ggcgcatggt gccaggaca gcgaaattcc ggttgctttt 2062
 ggggttctga ccaactgaaag cattgaacaa gcgatcgaac gtgctggcac caaagctggc 2122
 aacaaaggtg cagaagctgc actgaccgog cttgaaatga ttaatgtatt gaaagccatc 2182
 aaggcctgaa attagtaagg ggaaatccgt gaaacctgct gctcgtcgcg gcgctcgtga 2242
 gtgtgccgtc caggcgtct actcctggca gttgtcccag aacgacatcg ctgatgttga 2302
 ataccagttc ctggctgaac aggatgtaaa agacgttgac gtctgtact tccgtgagct 2362
 gctggccggg gtggcgacta ataccgata cctcgacgga ctgatgaagc catacctgtc 2422
 ccgcctgctg gaagaactgg gacaggtaga aaaagcagta ctgcgcattg cgctgtacga 2482
 actgtctaaa cgtagcgatg tgccatacaa agtggccatt aacgaagcga tcgaactggc 2542
 gaaatcgttc ggcgcagaag acagccataa gttcgtcaac ggcgctactcg ataaagcagc 2602
 acctgtgatt cgcctaaca aaaagtata tccaggcccg tagattcacg gaagaccgtt 2662
 ccatgatcgc cggccttttc ttttttacct gctgaggcat aacgtatggc atgtggcgag 2722

gtccgctgat ctcttacgac aaagagcaca tcatcaacct ggcccgcagc attggcaccg 9622
 aagactttgc tcgcacgatg ccggaatatt gtggtgtgat ctccaaaagc ccgacggtga 9682
 aagcagttaa atcgaagatt gaagcggaag aagagaagtt cgacttcagc attctcgata 9742
 aagtgggtga ggaagcgaat aacgttgata tccgcgaaat cgcgcgcagc accgagcagg 9802
 aagtgggtga agtggaacc gtcaatggct tcggcccgaa cgacgtgatc ctcgatatcc 9862
 gttctatcga tgaacaggaa gataagccac tgaaagtcga agggattgat gtggtttctc 9922
 tgccgttcta taaactgagc accaaatttg gcgatctcga ccagaacaaa acctggctgc 9982
 tgtggtgtga gcgcggggtg atgagccgtc tgcaggcgtc ctatctgcgc gagcagggct 10042
 ttaacaatgt gaaggtatat cgcgcgtaat ttgtggtttt tacgtcgcat ctggtcagat 10102
 gcgacgtttg ccgcatccga cactactcgt aataattata aatccctgcc gccatcacca 10162
 gttgtgatgc cacttcattg gctttttcac gcccaaccaa caggtcgata attttcagac 10222
 caaagtcgat agctgtacct ggcccctggc tggtcagcaa ttttaccctg gcacccaga 10282
 cgacgcgtt gtccagccat tgttcggcgg gaattttgtc tttcagcgtc gggaagccgg 10342
 tcatattacc aatcggggaag atatcgtgcg gcaccagcac ggtggctggc gcggcgcaaa 10402
 tagccgcgac gatacgcgcg gaacgggtga actgtttaac ggtttcaacc agcagagtgc 10462
 tatcgcgaaa aactccgcg cctttaatgc caccaggcag cacgatcagc tcatattcgc 10522
 catcagccac ttcgaccagc ggccatccg ccagcagctt cagccgcgc gagcaggtaa 10582
 tcgccaggtt accatcgtg gcgacgctg cagtgggtgac tttgataccg ccgcgaacca 10642
 gcagatcgat agtggtgacg gcttcagtct cttcactacc aggggcgagg caaaccagtg 10702
 ccgatgcgtc catattcaact ctcttttctt ttaccattt caaacaggcg ggtgttttcc 10762
 ggtacggcaa tcccatgcgc gcgggcgcgg cgtaagagaa aaccattgat atagtcgatt 10822
 tcagtgtggc gcagcgcgcg gatatcctgc aacatcgacg agatattttc cgctgtggca 10882
 tcaatcacct gcatcacgta atcacgcaaa tcttctgctg aagtatgatg cccttcgcgt 10942
 tcgatcaccg ccgcgaactt ttgcgatatc tgcataattt cttgcggatg atgacgtaat 11002
 tcaccgttcg ggcaattcca gatggcagtc agtggtataa tcacgcagtt gactgccagc 11062
 ttgcgccaca gtcggcgcg aatattgtta tgccaggcaa cgtcaggcaa caggtttgc 11122
 aaaatatccg ccagataact gtaatccccg tctgtttgcc gtgcggggcc aatatgcgtg 11182
 ataccgtttg ccacatgaat aatgacattg ccgtcgcggc gggtgcagtg ggtggtggtg 11242
 cccatcagta atggctgctg aatgttttgc aactcttoga tgggtgccat gccgttgtga 11302

attaacagta ttggcgtagt tacaggcagt gtggacgcga ggcttttgac ggcacggaa 11362
 acctgccatg ctttcagcgt caccaggagc agatcgctgg tggcgagaaa atcgggatcg 11422
 ttggcgggtca gcgattcggt aaatatogaa ccatctgtct caaccagatt cacgctacaa 11482
 taaggttgcg gtacgcgcag ccagccctga acttcatgac cctgtttgca aagtgtgtga 11542
 agccataatt gccctaaggc accgcatccc aatacggtaa ttttcattgt tcctcctcac 11602
 ccgcaaccac tccgggtgtt caataaggct atcccttaat tgtgcatgct gttgcgacta 11662
 tgcacaatta agggatacgt cctggtgcag 11692

<210> 39

<211> 367

<212> PRT

<213> Escherichia coli

<400> 39

Val Gln Asp Glu Tyr Tyr Met Ala Arg Ala Leu Lys Leu Ala Gln Arg
 1 5 10 15

Gly Arg Phe Thr Thr His Pro Asn Pro Asn Val Gly Cys Val Ile Val
 20 25 30

Lys Asp Gly Glu Ile Val Gly Glu Gly Tyr His Gln Arg Ala Gly Glu
 35 40 45

Pro His Ala Glu Val His Ala Leu Arg Met Ala Gly Glu Lys Ala Lys
 50 55 60

Gly Ala Thr Ala Tyr Val Thr Leu Glu Pro Cys Ser His His Gly Arg
 65 70 75 80

Thr Pro Pro Cys Cys Asp Ala Leu Ile Ala Ala Gly Val Ala Arg Val
 85 90 95

Val Ala Ser Met Gln Asp Pro Asn Pro Gln Val Ala Gly Arg Gly Leu
 100 105 110

Tyr Arg Leu Gln Gln Ala Gly Ile Asp Val Ser His Gly Leu Met Met
 115 120 125

Ser Glu Ala Glu Gln Leu Asn Lys Gly Phe Leu Lys Arg Met Arg Thr
 130 135 140

Gly Phe Pro Tyr Ile Gln Leu Lys Leu Gly Ala Ser Leu Asp Gly Arg
 145 150 155 160

Thr Ala Met Ala Ser Gly Glu Ser Gln Trp Ile Thr Ser Pro Gln Ala
 165 170 175

Arg Arg Asp Val Gln Leu Leu Arg Ala Gln Ser His Ala Ile Leu Thr
 180 185 190

Ser Ser Ala Thr Val Leu Ala Asp Asp Pro Ala Leu Thr Val Arg Trp
195 200 205

Ser Glu Leu Asp Glu Gln Thr Gln Ala Leu Tyr Pro Gln Gln Asn Leu
210 215 220

Arg Gln Pro Ile Arg Ile Val Ile Asp Ser Gln Asn Arg Val Thr Pro
225 230 235 240

Val His Arg Ile Val Gln Gln Pro Gly Glu Thr Trp Phe Ala Arg Thr
245 250 255

Gln Glu Asp Ser Arg Glu Trp Pro Glu Thr Val Arg Thr Leu Leu Ile
260 265 270

Pro Glu His Lys Gly His Leu Asp Leu Val Val Leu Met Met Gln Leu
275 280 285

Gly Lys Gln Gln Ile Asn Ser Ile Trp Val Glu Ala Gly Pro Thr Leu
290 295 300

Ala Gly Ala Leu Leu Gln Ala Gly Leu Val Asp Glu Leu Ile Val Tyr
305 310 315 320

Ile Ala Pro Lys Leu Leu Gly Ser Asp Ala Arg Gly Leu Cys Thr Leu
325 330 335

Pro Gly Leu Glu Lys Leu Ala Asp Ala Pro Gln Phe Lys Phe Lys Glu
340 345 350

Ile Arg His Val Gly Pro Asp Val Cys Leu His Leu Val Gly Ala
355 360 365

<210> 40

<211> 10944

<212> DNA

<213> Escherichia coli

<400> 40

tgcactccta ctatttaata tgtacgttcc atgctgaaaa gcccgttttc aggataactca 60
aatggaaacg cacagacata caaaagattg gctggctaata ctagccagct caacccaact 120
ttgcaagaaa aatatgcgaa aaaatcagcc ttggcgctgt ttatgcttcg gctcggcact 180
gcaaatacaca cggatgacac catcacgctt aacgattttg cagttacggc ataatttctt 240
gacggaagca cgaactttca tttttactct ccgtaacttc tcgggacgacc aattatcggc 300
cgtagccttt caggttcgcc ttcttcaatg cagactcata ctgactggac atcatcagag 360
tttgcaattg agccataaag tccataatca cgacaacaac gataagcagt gaggtcccac 420
cgaagtagaa cggtactttc attgcatcac gcatgaactc cgggatcagg cagataaagg 480

taatat	acag	cg	cacca	aacc	agggt	caggc	gggt	cattac	tttat	cgata	tactt	cgccg	540
tttgct	ctcc	cgga	cgaatt	cctgg	tacaa	atgc	accgga	cttctt	cagg	ttatct	gctg	600	
tttcac	gcg	gttga	aaaacc	aacgc	cgtgt	aga	agaaaca	gaaga	agatg	attgc	agacg	660	
catag	agtaa	cacata	aaagc	ggttg	cccag	gctg	caaata	cagcg	aaatt	gttgt	cagcc	720	
agttcca	aacc	agtacc	gccc	ccga	accatg	acgc	gatgg	cgccg	ggaac	agaata	aatac	780	
tggaag	cgaa	gattg	ccggg	attac	ccccg	ccat	attcac	tttc	agcgg	aaatg	tgtgc	840	
tctgtg	cagc	atag	acacga	cgac	cttgct	gacg	tttcgc	gtagt	ttacc	acaatg	cggc	900	
gttgacc	acg	ctca	acaaat	aca	acaaaga	acgt	cactgc	aaata	acta	actg	caacca	960	
acagca	acac	gagga	agtgc	agg	tcgcctt	gacg	cgcttg	ctcg	atagta	tg	ggcaatgg	1020	
ctggc	gggag	tccc	gcgaca	ata	ccggcga	agata	atgat	tgaa	ataccg	ttg	ccgatac	1080	
ctcg	ttcagt	aatct	gttcg	ccca	accaca	tcag	gaacat	gg	ttcctgtg	acc	agactta	1140	
caacag	cgg	gaag	tagaat	gcaa	agcccg	gg	ttaatcac	cagg	ccttg	ata	ccaggca	1200	
tattc	ggcag	accg	gtagca	ata	ccgatcg	actg	gaatat	tg	ccagcacc	agag	taccgt	1260	
agcgg	gtgta	ctgg	ctgatc	ttac	gacgac	cagac	tcccc	ttct	ttctta	attt	ctgcc	1320	
acg	ttgggtg	aacc	accgtc	agc	agctgga	taat	gatcga	cg	cgaaata	tac	ggcatga	1380	
tcccc	cagagc	aaag	atagaa	gcac	ggctga	gagc	accacc	agaga	acatg	ttaa	acatct	1440	
caatg	atgg	gcct	cgctgt	tgct	caagca	gttt	ggcaag	tac	agcggca	tca	ataccag	1500	
ggatc	ggaat	aaa	agagcca	ata	cggaaca	caat	cagcgc	acc	gataaca	aac	agcagtc	1560	
tgcg	tttcag	ctcg	cctaag	ccac	cttgg	cact	ttgaaa	atct	aatccc	gg	ttgtttag	1620	
ccatct	gcta	ctt	attcctc	gatt	ttaccg	ccag	cagctt	cgat	agcagc	acg	agcgct	1680	
ttag	taacac	gcag	gccacg	aac	agttacc	ggag	tcgtta	cttc	gccagc	cagg	atcact	1740	
ttcg	gaact	cgat	ctggat	acc	gataatg	ttag	ccgctt	tcag	cg	gtgtt	caggtctact	1800	
acac	gcctt	ctact	tttagc	cagg	tcagac	agac	gaattt	cgg	ctgtaat	cg	ctgcttta	1860	
cgaga	agtga	agcc	gaattt	cgg	cagacga	cgt	tacagag	gc	atctgacc	acc	ctcgaaa	1920	
ccgc	gacgta	cgcc	accgcc	aga	acgagac	ttct	gacctt	tgt	gaccacg	acc	accgg	1980	
ttacc	gaggc	caga	accgat	acc	acgacc	agg	cgtttac	ccg	ccttttt	ggag	ccttcg	2040	
gocg	gagaca	gagt	atttaa	acg	catctct	tact	cctcaa	ct	taaccat	gaag	gaaacc	2100	
gcg	ttgatca	tacc	gcgaat	agc	aggagta	tcct	cgcgct	ctac	ggtgtg	acca	atacga	2160	
cgc	agaccca	ggcc	aagcag	cg	ttgccttg	tg	ttcggca	gac	gacgat	tg	cactgcgg	2220	

gtggcgacg ttcagcatag tctgttcttg gatcatttta gtgctccgct aatgtcaact 5700
 actactgaga cccgaaaatc aggtcggttaa aaatcccat atcgaggcg cggcattata 5760
 acaccgcttc aaggatatgg gtagaaaaaa taaacggctc atttctgagc cgtttattcg 5820
 tattgagaga gtgtactgta ttacagaacc gttttctcta caacgcgaac cagcgccag 5880
 gatttagtct tggacagcgg acggcattcg cggatttcaa ccacgtcacc gataccgcat 5940
 tcgttggtct cgctcatgtac gtgcagtttg gtcgtacgct tgatgaattt accgtagatc 6000
 ggggtgttca caaaacgttc gatagcaaca acaatggatt tctccatttt gtcgctaaca 6060
 acgcgacctt gcagagtacg gattttatcg gtcattacgc accgccttc tcgttcagta 6120
 aagtcttaac gcgtgcgaca tcgcgacgca cttgcttcaa caggtgagac tgttgcagct 6180
 ggccacttgc agcctgcata cgcaggttga actgctcagc cagcaggttc agcagctcgg 6240
 tgttcagctc ttcaacgctc ttctcagcga gctcttttgc ttccattaca tcaccgtctt 6300
 agttacaaag gtggttttaa tcggcagttt cgtgctgcc agcttgaatg cttcacgggc 6360
 cagctcttcc ggaacaccgt ccatttcata caggacttta cccggctgaa tcaaggcaac 6420
 ccaatactcc acgttacctt tacctttacc catacgcaact gccagcggct tttcagtgat 6480
 cggtttgctc gggaacacac ggatccagat cttaccttga cgcttaactg cacgggtcat 6540
 agcacgacgt gctgcttcga tctgacgggc agtcagacga ccacggccaa cagctttcag 6600
 accgaagctg ccgaagctaa catccgtacc ctgcgccaga ccgcggttac ggctttgtg 6660
 cattttacgg aattttgtac gctttggttg taacatcagc gacgctcctt atttacggcc 6720
 tttacgctgc tgctttttag gctgagcagc cggtttttcc ggttgttcaa cagcagccat 6780
 accaccagg atctcgctt tgaagatcca cactttaacg ccgattacac cgtaagtgg 6840
 gtgcgcttca gaggtgttgt agtcgatgtc agcacgcaga gtgtgcagcg gtacgcgacc 6900
 ttgcgggtac cattcggtac gtgcgatttc cgcgcgcgcc agacggccgc taacttcaac 6960
 ttttaatact ttagcgccca gacgcattgc gttctgtaca gcacgcttca tagcacgacg 7020
 gaacataacg cgacgttcca gctgagaagt gatgctgtca gcaaccagtt ttgcgtccag 7080
 ttcaggotta cgaacttcgg cgatgttgat ctgtgcagga acgcagcga tgtccgctac 7140
 gaccttacgc agtttttcta cgtcttcacc ttttttaccg ataacgatac ccgggcgagc 7200
 agtgtgaatg gttacacgga tgctcttagc cggacgctcg ataacgatac gagatacgg 7260
 cgcttttagc agtttccttag tcaggtactg acgtacttta aaatcgctgt ccaggttgtc 7320

agcgaattct ttggtgttcg caaaccaggt agagtccat ggttttacaa taccaggcg 7380
 aataccatta ggatgtactt tctgaccat tgetagtctc cagagtctca gcgatcggac 7440
 acaaccacag tgatgtggct ggtgcgcttc aggatgcgat ctgcacgacc ttttgcacgc 7500
 ggcataatgc gcttcatgct cgggccttcg tctacgaaaa ttttcgtaac tttcagatcg 7560
 tcaatgtcag cgcctatggt gtgttcagcg ttagcaatgg cagattccag aactttcttg 7620
 accagtacag ccgctttctt gttggtgtag gtcaaaatat ccagagcctg cgacactttc 7680
 ttaccgcgaa tcaggtcagc aacaaggcga accttctgag cagaagaacg agcatggcga 7740
 tgttttagoga tagtttccat ctcttctcc taccttattt ctcttctgct tttttatcag 7800
 cagcgtggcc gcgataagta cgagtcggtg cgaattcacc cagtttgtga ccaaccattt 7860
 cgtcggttac aaataccgga acgtgctgac gaccattatg gacagcgatg gtcaaaccga 7920
 tcatgttagg aaagatcgtt gaacgacggg accaagtgcg caggggcttc ttgtctccgc 7980
 tttccaccgc tttctctacc ttcttcagca agtgcaggtc aataaaaagga cctttcttga 8040
 gagaacgtgg catggcttat cctctaaaat tatttgctac ggcgacgtac gatgaattta 8100
 tcagtacgct tgttgctgcg ggtcttctta cctttggtct gaacgcccc cggagttacc 8160
 gggtgcttac caaagttacg accttcacca ccaccatgtg ggtggtctac cgggttcac 8220
 gcggtaccgc gaacggctcg acgaacacca cgccagcgtg cagcacctgc tttaccaga 8280
 acgogcagca tatgctcagc attgccaact togcccagag ttgcacggca gtctgcttct 8340
 actttacgca tttcaccaga acgcagacgc agggtgacat aagcaccatc acgagcaacg 8400
 atctgaacgt aagtaccagc ggaacgtgcc agctgaccgc ctttacctgg tttcatttct 8460
 acgttatgaa cagtagaacc aaccgggatg ttgcgcacgc gcagggtgtt acctgggttg 8520
 attgcagcat caacgccaga ctgaatctgg tcgccagctt tcaggccttt aggggccagg 8580
 atgtaacggc gttcacgcgc tttgtacaga accagocgca tgttcgcgga acggttcgga 8640
 tcgtactcaa gacgttcaac aactgcggg ataccgtctt tgttgcttt gaagtcaaca 8700
 atacggtaag cctgcttggt gccaccaccg atatgacgag tggtgatacg gccattgttg 8760
 ttacgaccac cggatttgcg gtttttttcc agcaacggag caaaaggttt gcccttgtgc 8820
 agctcagggt taaccacttt aactacgtgg cgacgaccg gagatgtcgg tttacattta 8880
 acaactgcc ttgtattact cctccgactt actcagcgcc gccaacgaag tccagattct 8940
 ggccttcttt cagggtgacg taagcttttt tccagtcgct acgacgaccg atacgtgtc 9000
 cgtgacgttt aactttccct ttaactacca ggggtgtaac gacttcgact tcgacttcaa 9060

atcgatcaga cgatgatcaa acgctttcag gcggatacgg attctttggt tctgcatgag 10800
 accagagctc caattatattt ataaacgaaa atgattactc ctcagaccca ttacgattga 10860
 tgggagagtg taaccgttct tacgtagctc cccgattggg agcattgtta ggtagccaaa 10920
 ttcggctaac tgaggttcag attg 10944

<210> 41

<211> 179

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 4426-4965 of seq id 40

<400> 41

Met Ala Lys Leu His Asp Tyr Tyr Lys Asp Glu Val Val Lys Lys Leu
 1 5 10 15

Met Thr Glu Phe Asn Tyr Asn Ser Val Met Gln Val Pro Arg Val Glu
 20 25 30

Lys Ile Thr Leu Asn Met Gly Val Gly Glu Ala Ile Ala Asp Lys Lys
 35 40 45

Leu Leu Asp Asn Ala Ala Ala Asp Leu Ala Ala Ile Ser Gly Gln Lys
 50 55 60

Pro Leu Ile Thr Lys Ala Arg Lys Ser Val Ala Gly Phe Lys Ile Arg
 65 70 75 80

Gln Gly Tyr Pro Ile Gly Cys Lys Val Thr Leu Arg Gly Glu Arg Met
 85 90 95

Trp Glu Phe Phe Glu Arg Leu Ile Thr Ile Ala Val Pro Arg Ile Arg
 100 105 110

Asp Phe Arg Gly Leu Ser Ala Lys Ser Phe Asp Gly Arg Gly Asn Tyr
 115 120 125

Ser Met Gly Val Arg Glu Gln Ile Ile Phe Pro Glu Ile Asp Tyr Asp
 130 135 140

Lys Val Asp Arg Val Arg Gly Leu Asp Ile Thr Ile Thr Thr Thr Ala
 145 150 155 160

Lys Ser Asp Glu Glu Gly Arg Ala Leu Leu Ala Ala Phe Asp Phe Pro
 165 170 175

Phe Arg Lys

<210> 42

<211> 1039C

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (432)..(1862)

<400> 42

```

aaaattctta cgtaatttat aatctttaaa aaaagcattt aatattgctc cccgaacgat 60
tgtgattoga ttcacattta aacaatttca gaatagacaa aaactctgag tgtaataatg 120
tagcctcgtg tcttgcgagg ataagtgcac tatgaatatc ttacatatat gtgtgacctc 180
aaaatgggtc aatattgaca acaaaattgt cgatcaccgc ccttgatttg cccttctgta 240
gccatcacca gagccaaacc gattagattc aatgtgatct atttgtttgc tatatcttaa 300
ttttgccttt tgcaaaggtc atctctcggt tatttacttg ttttagtaaa tgatgggtgct 360
tgcatatata tctggcgaat taatcgggat agcagatgta atattcacag ggatcactgt 420
aattaaaata a atg aag gat tat gta atg gaa aac ttt aaa cat ctc cct 470
          Met Lys Asp Tyr Val Met Glu Asn Phe Lys His Leu Pro
              1             5             10

gaa ccg ttc cgc att cgt gtt att gag cca gta aaa cgt acc act cgc 518
Glu Pro Phe Arg Ile Arg Val Ile Glu Pro Val Lys Arg Thr Thr Arg
          15             20             25

gct tat cgt gaa gag gca att att aaa tcc ggt atg aac ccg ttc ctg 566
Ala Tyr Arg Glu Glu Ala Ile Ile Lys Ser Gly Met Asn Pro Phe Leu
          30             35             40             45

ctg gat agc gaa gat gtt ttt atc gat tta ctg acc gac agc ggc acc 614
Leu Asp Ser Glu Asp Val Phe Ile Asp Leu Leu Thr Asp Ser Gly Thr
              50             55             60

ggg gcg gtg acg cag agc atg cag gct gcg atg atg cgc ggc gac gaa 662
Gly Ala Val Thr Gln Ser Met Gln Ala Ala Met Met Arg Gly Asp Glu
              65             70             75

gcc tac agc ggc agt cgt agc tac tat gcg tta gcc gag tca gtg aaa 710
Ala Tyr Ser Gly Ser Arg Ser Tyr Tyr Ala Leu Ala Glu Ser Val Lys
              80             85             90

aat atc ttt ggt tat caa tac acc att ccg act cac cag ggc cgt ggc 758
Asn Ile Phe Gly Tyr Gln Tyr Thr Ile Pro Thr His Gln Gly Arg Gly
              95             100             105

gca gag cas atc tat att ccg gta ctg att aaa aaa cgc gag cag gaa 806
Ala Glu Gln Ile Tyr Ile Pro Val Leu Ile Lys Lys Arg Glu Gln Glu
          110             115             120             125

aaa ggc ctg gat cgc agc aaa atg gtg gcg ttc tct aac tat ttc ttt 854
Lys Gly Leu Asp Arg Ser Lys Met Val Ala Phe Ser Asn Tyr Phe Phe
              130             135             140

```

The sequence data was obtained from the GenBank database. The accession number for the Escherichia coli genome is GCF_000000000.1. The sequence was downloaded on 10/10/2019.

gat acc acg cag ggc cat agc cag atc aac ggc tgt acc gtg cgt aac 902
Asp Thr Thr Gln Gly His Ser Gln Ile Asn Gly Cys Thr Val Arg Asn
145 150 155

gtc tat atc aaa gaa gcc ttc gat acg ggc gtg cgt tac gac ttt aaa 950
Val Tyr Ile Lys Glu Ala Phe Asp Thr Gly Val Arg Tyr Asp Phe Lys
160 165 170

ggc aac ttt gac ctt gag gga tta gaa cgc ggt att gaa gaa gtt ggt 998
Gly Asn Phe Asp Leu Glu Gly Leu Glu Arg Gly Ile Glu Glu Val Gly
175 180 185

ccg aat aac gtg ccg tat atc gtt gca acc atc acc agt aac tct gca 1046
Pro Asn Asn Val Pro Tyr Ile Val Ala Thr Ile Thr Ser Asn Ser Ala
190 195 200 205

ggg ggt cag ccg gtt tca ctg gca aac tta aaa gcg atg tac agc atc 1094
Gly Gly Gln Pro Val Ser Leu Ala Asn Leu Lys Ala Met Tyr Ser Ile
210 215 220

gcg aag aaa tac gat att ccg gtg gta atg gac tcc gcg cgc ttt gct 1142
Ala Lys Lys Tyr Asp Ile Pro Val Val Met Asp Ser Ala Arg Phe Ala
225 230 235

gaa aac gcc tat ttc atc aag cag cgt gaa gca gaa tac aaa gac tgg 1190
Glu Asn Ala Tyr Phe Ile Lys Gln Arg Glu Ala Glu Tyr Lys Asp Trp
240 245 250

acc atc gag cag atc acc cgc gaa acc tac aaa tat gcc gat atg ctg 1238
Thr Ile Glu Gln Ile Thr Arg Glu Thr Tyr Lys Tyr Ala Asp Met Leu
255 260 265

gcg atg tcc gcc aag aaa gat gcg atg gtg ccg atg ggc ggc ctg ctg 1286
Ala Met Ser Ala Lys Lys Asp Ala Met Val Pro Met Gly Gly Leu Leu
270 275 280 285

tgc atg aaa gac gac agc ttc ttt gat gtg tac acc gag tgc aga acc 1334
Cys Met Lys Asp Ser Phe Phe Asp Val Tyr Thr Glu Cys Arg Thr
290 295 300

ctt tgc gtg gtg cag gaa ggc ttc ccg aca tat ggc ggc ctg gaa ggc 1382
Leu Cys Val Val Gln Glu Gly Phe Pro Thr Tyr Gly Gly Leu Glu Gly
305 310 315

ggc gcg atg gag cgt ctg gcg gta ggt ctg tat gac ggc atg aat ctc 1430
Gly Ala Met Glu Arg Leu Ala Val Gly Leu Tyr Asp Gly Met Asn Leu
320 325 330

gac tgg ctg gct tat cgt atc gcg cag gta cag tat ctg gtc gat ggt 1478
Asp Trp Leu Ala Tyr Arg Ile Ala Gln Val Gln Tyr Leu Val Asp Gly
335 340 345

ctg gaa gag att ggc gtt gtc tgc cag cag gcg ggc ggt cac gcg gca 1526
Leu Glu Glu Ile Gly Val Val Cys Gln Gln Ala Gly Gly His Ala Ala
350 355 360 365

ttc gtt gat gcc ggt aaa ctg ttg ccg cat atc ccg gca gac cag ttc 1574
 Phe Val Asp Ala Gly Lys Leu Leu Pro His Ile Pro Ala Asp Gln Phe
 370 375 380

ccg gca cag gcg ctg gcc tgc gag ctg tat aaa gtc gcc ggt atc cgt 1622
 Pro Ala Gln Ala Leu Ala Cys Glu Leu Tyr Lys Val Ala Gly Ile Arg
 385 390 395

gcg gta gaa att ggc tct ttc ctg tta ggc cgc gat ccg aaa acc ggt 1670
 Ala Val Glu Ile Gly Ser Phe Leu Leu Gly Arg Asp Pro Lys Thr Gly
 400 405 410

aaa caa ctg cca tgc ccg gct gaa ctg ctg cgt tta acc att ccg cgc 1718
 Lys Gln Leu Pro Cys Pro Ala Glu Leu Leu Arg Leu Thr Ile Pro Arg
 415 420 425

gca aca tat act caa aca cat atg gac ttc att att gaa gcc ttt aaa 1766
 Ala Thr Tyr Thr Gln Thr His Met Asp Phe Ile Ile Glu Ala Phe Lys
 430 435 440 445

cat gtg aaa gag aac gcg gcg aat att aaa gga tta acc ttt acg tac 1814
 His Val Lys Glu Asn Ala Ala Asn Ile Lys Gly Leu Thr Phe Thr Tyr
 450 455 460

gaa ccg aaa gta ttg cgt cac ttc acc gca aaa ctt aaa gaa gtt taa 1862
 Glu Pro Lys Val Leu Arg His Phe Thr Ala Lys Leu Lys Glu Val
 465 470 475

ttaatactac agagtggcta taaggatggt agccactctc ttaccctaca tcttcaataa 1922
 caaaaatagc cttcctctaa aggtggcatc atgactgac aagctgaaaa aaagcactct 1982
 gcattttggg gtgttatggt tatagcaggt acagtaattg gtggaggtat gtttgcttta 2042
 cctgttgatc ttgccggtgc ctgggttttc tgggggtgcct ttatccttat cattgcctgg 2102
 ttttcaatgc ttcattccgg gttattgtta ttagaagcaa atttaaatta tcccgtcggc 2162
 tccagtttta acaccatcac caaagattta atcggttaaca cctggaacat tatcagcggg 2222
 attaccgttg ccttcgttct ctatatactc acttatgcct atatctctgc taatgggtgcg 2282
 atcattagtg aaacgatatc aatgaatttg ggttatcacg ctaatccacg tattgtcggg 2342
 atctgcacag ccattttcgt tgccagcgta ttgtgggtta gttcgttagc cgccagtcgt 2402
 attacctcat tgttcctcgg gctgaagatt atctcctttg tgatcgtgtt tggttctttt 2462
 ttcttcagg tcgattactc cattctgcgc gacgccacca gctccactgc gggaaacgtct 2522
 tacttcccgt atatctttat ggctttgcg gtgtgtctgg cgtcatttgg tttccacggc 2582
 aatattccca gcctgattat ttgctatgga aaacgcaaag ataagttaat caaaagcgtg 2642
 gtatttggtt cgctgctggc gctgggtgatt tatctcttct ggctctattg caccatgggg 2702
 aatattccgc gagaaagctt taaggcgatt atctcctcag gcggcaacgt tgattcgtg 2762

gtgaaatcgt tccctcggcac caaacagcac ggcattatcg agttttgcct gctggtgttc 2822
 tctaacttag ctgttgccag ttcgttcttt ggtgtcacgc tggggttggt cgattatctg 2882
 gcggacctgt ttaagattga taactccac ggcgggcggt tcaaaaccgt gctgttaacc 2942
 ttctgccac ctgcgttggt gtatctgac ttcccgaacg gctttattta cgggatcggc 3002
 ggtgccgggc tgtgccccac catctggggc gtcattatc ccgcagtgt tgcaatcaaa 3062
 gctcgcaaga agtttcccaa tcagatgttc acggtctggg gcggcaatct tattccggcg 3122
 attgtcattc tctttggtat aaccgtgatt ttgtgctggt tcggcaacgt ctttaacgtg 3182
 ttacctaaat ttggctaaat ccttcaagaa gccagccatt cgctggcttc ttgcctctca 3242
 ggaaatcact tatgtccaaa tggcaactcg cctgatcctc cttcaccacg tatgctttgc 3302
 gtcaccttac tatcaggacg ctttagccca tgtcccgtt tttgatttgt agttttgccc 3362
 tggttttact ctatcccgcc gggattgata tgtacctcg tggtttacg cgcacgcgcg 3422
 ccgatctcaa tgcacgcgaa gcgcagttgc atattgcgtt ctccgtatat ctggcgggga 3482
 tggcagctgc gatgttattt gcgggtaaag tggccgatcg ttcagggaga aagccggtcg 3542
 ccatacccg cgcggcgcta tttattattg cctcggtgtt ctgttactg gctgaaacca 3602
 gcacgttatt tcttgcaggc cgatttctac aggggttggg cgcaggctgt tgttacgtag 3662
 tggcgttcgc tattttgcgc gacacgctgg atgatcgacg tcgggctaaa gtgctgtcat 3722
 tactcaacgg tattacctgc atcattccgg tgttagcgcc agtgctcgga catctgatta 3782
 tgcttaaatt cccgtggcag agtctgttct gggcgatggc aatgatgggc atcgcggtac 3842
 tgatgttgtc tttgtttatt taaaagaaa cgcgccacg gcccccgc gcttcggata 3902
 aaccacgaga aaatagcgag tcgctgctta accgtttttt cctcagccgt gttgttatca 3962
 ccacctcag cgtttcggtg atcctcactt tcgtcaacac gtcaccgta ttgctgatgg 4022
 aaatcatggg gtttgagcgc ggtgaatacg ccaccattat ggcgctgacc gctggcgta 4082
 gcatgaccgt ttcattctcc acgccatttg cgctgggaat ttttaagcca cgtacgttga 4142
 tgatcacctc gcaggtgtta ttctggcgg cggggatcac tcttgccgtt tcacctccc 4202
 atgcggtttc tctgtttggt atcacgctga tttgcgcgg tttctcggtg ggttttggtg 4262
 tggcgatgag tcaggcgta gggcggtttt cattacgcgc ggcgtagcc agctcgacct 4322
 taggtattgc gcaggtttgc ggttcgtcac tgtggatttg gctggcagcg gtggttggtg 4382
 tcggcgcatg gaatatgctg atcgggattc tgattgctg tagcatagt agcctgttgc 4442

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

19 111

attgctggca ggtgtggtga tgagcagaat cattaccgt ctaccggat tggatatttc 9662
 atgtcctgaa acagactctt taagttaagc gggatacttt atctttgggc tactcaaaag 9722
 cagacaggat gtttctatga ctcaaaatat caggccgtta cccaattca aatatcatcc 9782
 caagccactg gaaacaggcg catttgaaca ggataaaacc gtagagtgcg attgctgtga 9842
 acaacagacg tcagtttatt actcgggtcc cttttattgc gttgatgaag ttgaacatct 9902
 ctgtccgtgg tgtattgcgg acggttctgc tgctgaaaag tttgcaggta gttttcagga 9962
 tgatgccagc atagaagggtg ttgaatttga gtatgatgaa gaggacgaat ttgccggtat 10022
 taagaacaca tatcctgatg aaatgctgaa agagttggtt gaacgcacgc caggttatca 10082
 tggatggcag caggaattct ggctcgcgca ttgtggcgat ttctgtgttt ttatcggcta 10142
 tgtgggctgg aatgatataa aagatcgctt cgatgaattt gccaaccttg aagaagattg 10202
 tgagaatttc ggtattagaa attctgatct agctaaatgc ctgcaaaagg gtggtcattg 10262
 tcagggttat ctcttccgct gtctccactg cggcaagctg agactgtggg gtgatttttc 10322
 gtagttattt aaataatgag aacaggccgg agcgtaattc acacatccgg cttattttct 10382
 taagctta 10390

<210> 43

<211> 476

<212> PRT

<213> Escherichia coli

<400> 43

Met Lys Asp Tyr Val Met Glu Asn Phe Lys His Leu Pro Glu Pro Phe
 1 5 10 15

Arg Ile Arg Val Ile Glu Pro Val Lys Arg Thr Thr Arg Ala Tyr Arg
 20 25 30

Glu Glu Ala Ile Ile Lys Ser Gly Met Asn Pro Phe Leu Leu Asp Ser
 35 40 45

Glu Asp Val Phe Ile Asp Leu Leu Thr Asp Ser Gly Thr Gly Ala Val
 50 55 60

Thr Gln Ser Met Gln Ala Ala Met Met Arg Gly Asp Glu Ala Tyr Ser
 65 70 75 80

Gly Ser Arg Ser Tyr Tyr Ala Leu Ala Glu Ser Val Lys Asn Ile Phe
 85 90 95

Gly Tyr Gln Tyr Thr Ile Pro Thr His Gln Gly Arg Gly Ala Glu Gln
 100 105 110

Ile Tyr Ile Pro Val Leu Ile Lys Lys Arg Glu Gln Glu Lys Gly Leu
 115 120 125
 Asp Arg Ser Lys Met Val Ala Phe Ser Asn Tyr Phe Phe Asp Thr Thr
 130 135 140
 Gln Gly His Ser Gln Ile Asn Gly Cys Thr Val Arg Asn Val Tyr Ile
 145 150 155 160
 Lys Glu Ala Phe Asp Thr Gly Val Arg Tyr Asp Phe Lys Gly Asn Phe
 165 170 175
 Asp Leu Glu Gly Leu Glu Arg Gly Ile Glu Glu Val Gly Pro Asn Asn
 180 185 190
 Val Pro Tyr Ile Val Ala Thr Ile Thr Ser Asn Ser Ala Gly Gly Gln
 195 200 205
 Pro Val Ser Leu Ala Asn Leu Lys Ala Met Tyr Ser Ile Ala Lys Lys
 210 215 220
 Tyr Asp Ile Pro Val Val Met Asp Ser Ala Arg Phe Ala Glu Asn Ala
 225 230 235 240
 Tyr Phe Ile Lys Gln Arg Glu Ala Glu Tyr Lys Asp Trp Thr Ile Glu
 245 250 255
 Gln Ile Thr Arg Glu Thr Tyr Lys Tyr Ala Asp Met Leu Ala Met Ser
 260 265 270
 Ala Lys Lys Asp Ala Met Val Pro Met Gly Gly Leu Leu Cys Met Lys
 275 280 285
 Asp Asp Ser Phe Phe Asp Val Tyr Thr Glu Cys Arg Thr Leu Cys Val
 290 295 300
 Val Gln Glu Gly Phe Pro Thr Tyr Gly Gly Leu Glu Gly Gly Ala Met
 305 310 315 320
 Glu Arg Leu Ala Val Gly Leu Tyr Asp Gly Met Asn Leu Asp Trp Leu
 325 330 335
 Ala Tyr Arg Ile Ala Gln Val Gln Tyr Leu Val Asp Gly Leu Glu Glu
 340 345 350
 Ile Gly Val Val Cys Gln Gln Ala Gly Gly His Ala Ala Phe Val Asp
 355 360 365
 Ala Gly Lys Leu Leu Pro His Ile Pro Ala Asp Gln Phe Pro Ala Gln
 370 375 380
 Ala Leu Ala Cys Glu Leu Tyr Lys Val Ala Gly Ile Arg Ala Val Glu
 385 390 395 400
 Ile Gly Ser Phe Leu Leu Gly Arg Asp Pro Lys Thr Gly Lys Gln Leu
 405 410 415

aatcaatcac ggcaactgatg tcttcagttac gaatgtatgg gttttctaac tgacgcggct 9780
 cgccgccact ttcacottga taagatgogt cataagcaat agtgacaaat cccttttccg 9840
 ccagtttttt ggcatagggtt cgggccgttt gttctttaac gccccacct gggtagagata 9900
 acacaattgc ctgatactga cgggtttcat caaatTTTgg agggaaatag atcactgcag 9960
 acaaagagat ggttgagatta ttgctgtagg tgaagctgac tttattattc atcattccgt 10020
 tctcatgga gttgtcgggtt cgttttaacg gttggtagata tcactataga tattgatcat 10080
 taagttgatt agacccaaaa tcatgattag acctatca 10118

<210> 45

<211> 168

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 6467-6937 of seq id 44

<400> 45

Met Ser Gln Thr Val His Phe Gln Gly Asn Pro Val Thr Val Ala Asn
 1 5 10 15

Ser Ile Pro Gln Ala Gly Ser Lys Ala Gln Thr Phe Thr Leu Val Ala
 20 25 30

Lys Asp Leu Ser Asp Val Thr Leu Gly Gln Phe Ala Gly Lys Arg Lys
 35 40 45

Val Leu Asn Ile Phe Pro Ser Ile Asp Thr Gly Val Cys Ala Ala Ser
 50 55 60

Val Arg Lys Phe Asn Gln Leu Ala Thr Glu Ile Asp Asn Thr Val Val
 65 70 75 80

Leu Cys Ile Ser Ala Asp Leu Pro Phe Ala Gln Ser Arg Phe Cys Gly
 85 90 95

Ala Glu Gly Leu Asn Asn Val Ile Thr Leu Ser Thr Phe Arg Asn Ala
 100 105 110

Glu Phe Leu Gln Ala Tyr Gly Val Ala Ile Ala Asp Gly Pro Leu Lys
 115 120 125

Gly Leu Ala Ala Arg Ala Val Val Val Ile Asp Glu Asn Asp Asn Val
 130 135 140

Ile Phe Ser Gln Leu Val Asp Glu Ile Thr Thr Glu Pro Asp Tyr Glu
 145 150 155 160

Ala Ala Leu Ala Val Leu Lys Ala
 165

<210> 46
 <211> 11850
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (9115)..(11790)

<400> 46
 aaacgtcgag tcgtttactt aaggcctgaa gagttcaaac agactttact atcagtgagt 60
 cagatgtaag ttctgactca ctgttgacaa aaagcatatc agacgcctgg gaaggcgaca 120
 ccaaaaggaa gctctatgag cgaaaagcta cagaaagtgc tggcgcggtgc cggccacggt 180
 tctcgccgtg aaatcgaatc tattattgaa gccggtcgtg tgagtgttga tggcaaaatt 240
 gctaaactcg gcgatcgtgt tgaagttacc cctggattga aaatccgtat cgatgggtcac 300
 ctgatttcgg tacgtgagtc cgctgaacaa atttgtcggg ttctggccta ttacaaaccg 360
 gaaggtgagt tgtgtaccgg taacgatccg gaaggacgtc caacggtgtt tgaccgtctg 420
 ccaaaaactgc gtggcgcaag ctggattgcc gtgggtcgtc tggacgttaa tacctgtggt 480
 ctgctgctgt tcaccaccga tgggtgaactg gcaaaccgtt taatgcaccc aagccgtgaa 540
 gttgaacgtg aatatgccgt gcgtgtatct gggtcagggtg acgacgcgaa actgcgtgat 600
 ttgagtcgtg gcgtgcagtt ggaagatggt ccggcagctt ttaaaaccat caagttcagc 660
 ggcggcgaag ggatcaacca gtggtacaac gtgactctga ccgaaggccg taaccgtgaa 720
 gttcgtcgtc tgtgggaagc ggttgggtgtg caggtgagcc gcctgatccg tgttcgttac 780
 ggtgatatac cactgccaaa aggtctgcca cgcggtgggt ggacggagct ggacctcgcc 840
 cagactaact atctgcgcga actggtggag ctaccgccag aaaccagctc taaagtgcgt 900
 gtagaaaaag accgtcgtcg catgaaggcg aatcagattc gtcgtgcggt gaaacgtcac 960
 agtcagggtg gcggcggtcg tcgttctggc ggacgtaata ataacggtta atcaaagtat 1020
 gccggacgtc atatccggca tttttacaga ttaataatcg atccctatct gcgcttttac 1080
 accggcatca aacgcatggt tgacggggcg taattcactt accgtatctg ccagttcaag 1140
 aatatccga tgacaaccac gaccogtgat aatcacgctc tgttgatgtg gacgttcatt 1200
 taacgcctgc accattctt ccagtggcaa atagtcatac gccaccatat acgtcagttc 1260
 atcaagcaaa accatatcca gtgaggaatc agcaagcacc cgctttgcat gttgccagac 1320
 ttcgcggcag gcggcggtat cagactcgcg gttttgtgta tcccaggtaa agcccgttgc 1380

bioRxiv preprint doi: <https://doi.org/10.1101/000000>; this version posted January 1, 2014. The copyright holder for this preprint (which was not certified by peer review) is the author/funder, who has granted bioRxiv a license to display the preprint in perpetuity. It is made available under aCC-BY-NC-ND 4.0 International license.

atggttacgg	gctggcggt	tgcgaactgc	agcgtctgcg	cgataaaaac	attcctttaa	3120
ctgttacggt	agacaaaagtc	gctgccagcg	gcggttacat	gatggcctgt	gtggcggaca	3180
aaattgtttc	cgcaccgttt	gctattgtgg	gttcatttgg	cgtggtggcg	caaatgccca	3240
actttaaccg	cttcctgaaa	agcaaagata	ttgatatcga	actgcacact	gccgggcagt	3300
ataagcgcac	gctgacgttg	ctgggtgaaa	ataccgaaga	agggcgggag	aaattccgcg	3360
aagagttgaa	cgaaacgcac	cagttgttta	aagattttgt	gaagcgtatg	cgtccttctc	3420
tggatattga	acaggtggca	acgggtgaac	actggtacgg	acaacaggcg	gtagagaaag	3480
gcctggttga	tgaaatcaac	accagtgatg	aagttattct	tagcctgatg	gaaggccgtg	3540
aagtggtaa	tgtacgttat	atgcagcgtg	aacgactcat	tgaccgattc	accggcagcg	3600
cggcagagag	cgccgatcga	ttgttgctac	gctggtggca	gcgggggtcaa	aagccattga	3660
tgtaaaagac	aaacgcgagg	ctaagacctc	gcgttttgct	ttaatcaacc	agatgatatt	3720
tttctgaaa	cacatgggcc	aggtgtttga	acatattaaa	caccgcggtg	cttttggtctg	3780
ttggcaatcc	ttgttcacat	aaaaagtagt	cgccggtaaa	taccagcacg	ccattacgct	3840
gcgtgacgcc	ggtggcttca	atccctgcga	gcgtatcctc	atgctcacga	atgattttgt	3900
tggcctcttt	caacagcggt	tgcgcgtcga	tgggttgtgt	ctctttgttc	attatttact	3960
ccttaaacaa	ggacattagt	ctacgccagg	catggccttg	agacaaatat	accacgctgg	4020
tggcaagagc	gccttactgg	caactttgga	ttttgcatgc	taataaagtt	gcgtatcgga	4080
ttttatcagg	tacagtgtga	cgctttcgtc	aatctggcaa	tagatttgct	tgacattcga	4140
ccaaaattcc	gtcgtgctat	agcgcctgta	ggccaagacc	tgttaactca	gtcacctgaa	4200
ttttcgtgaa	cagagtcacg	acaagggggt	gatatccgca	gagagcgagt	ccatatcggt	4260
aactcgttgc	cagtggaaag	tttatcaacg	tgcgacgcac	tcctggaaga	atcaaattag	4320
gtaagggtgaa	tatgggtaaa	gctcttgtca	tcgttgagtc	cccggcaaaa	gccaaaacga	4380
tcaacaagta	tctgggtagt	gactacgtgg	tgaaatccag	cgtcggtcac	atccgcgatt	4440
tgccgaccag	tggctcagct	gccaaaaaga	gtgccgactc	tacctccacc	aagacggcta	4500
aaaagcctaa	aaaggatgaa	cgtggcgctc	tcgtcaaccg	tatgggggtt	gaccggtggc	4560
acaattggga	ggcgcactat	gaagtgttgc	ctggtaaaga	gaaggtcgtc	tctgaactga	4620
aacaactggc	tgaaaaagcc	gaccacatct	atctcgcaac	cgaccttgac	cgcgaagggg	4680
aagccattgc	atggcacctg	cgggaagtga	ttgggggtga	tgatgcgcgc	tatagccgag	4740
tggtgtttaa	cgaaattact	aaaaacgcga	tccgccaggc	atttaacaaa	ccgggtgagc	4800

19 100

gtt gat ctg gcg gca atg cgc gaa gcg gtt aaa cgc ctc ggc ggc gat 9453
 Val Asp Leu Ala Ala Met Arg Glu Ala Val Lys Arg Leu Gly Gly Asp
 100 105 110

act gca aag gtt aac ccg ctc tca ccg gtc gac ctg gtc att gac cac 9501
 Thr Ala Lys Val Asn Pro Leu Ser Pro Val Asp Leu Val Ile Asp His
 115 120 125

tcg gtg acc gtc gat cgt ttt ggt gat gat gag gca ttt gaa gaa aac 9549
 Ser Val Thr Val Asp Arg Phe Gly Asp Asp Glu Ala Phe Glu Glu Asn
 130 135 140 145

gta cgc ctg gaa atg gag cgc aac cac gaa cgt tat gtg ttc ctg aaa 9597
 Val Arg Leu Glu Met Glu Arg Asn His Glu Arg Tyr Val Phe Leu Lys
 150 155 160

tgg gga aag caa gcg ttc agt cgg ttt agc gtc gtg ccg cca ggc aca 9645
 Trp Gly Lys Gln Ala Phe Ser Arg Phe Ser Val Val Pro Pro Gly Thr
 165 170 175

ggc att tgc cat cag gtt aac ctc gaa tat ctc ggc aaa gca gtg tgg 9693
 Gly Ile Cys His Gln Val Asn Leu Glu Tyr Leu Gly Lys Ala Val Trp
 180 185 190

agt gaa ttg cag gac ggt gaa tgg att gct tat ccg gat aca ctc gtt 9741
 Ser Glu Leu Gln Asp Gly Glu Trp Ile Ala Tyr Pro Asp Thr Leu Val
 195 200 205

ggt act gac tcg cac acc acc atg atc aac ggc ctt ggc gtg ctg ggg 9789
 Gly Thr Asp Ser His Thr Thr Met Ile Asn Gly Leu Gly Val Leu Gly
 210 215 220 225

tgg ggc gtt ggt ggg atc gaa gca gaa gcc gca atg tta ggc cag ccg 9837
 Trp Gly Val Gly Gly Ile Glu Ala Glu Ala Ala Met Leu Gly Gln Pro
 230 235 240

gtt tcc atg ctt atc ccg gat gta gtg ggc ttc aaa ctt acc gga aaa 9885
 Val Ser Met Leu Ile Pro Asp Val Val Gly Phe Lys Leu Thr Gly Lys
 245 250 255

tta cgt gaa ggt att acc gcc aca gac ctg gtt ctc act gtt acc caa 9933
 Leu Arg Glu Gly Ile Thr Ala Thr Asp Leu Val Leu Thr Val Thr Gln
 260 265 270

atg ctg cgc aaa cat ggc gtg gtg ggg aaa ttc gtc gaa ttt tat ggt 9981
 Met Leu Arg Lys His Gly Val Val Gly Lys Phe Val Glu Phe Tyr Gly
 275 280 285

gat ggt ctg gat tca cta ccg ttg gcg gat cgc gcc acc att gcc aat 10029
 Asp Gly Leu Asp Ser Leu Pro Leu Ala Asp Arg Ala Thr Ile Ala Asn
 290 295 300 305

atg tcg cca gaa tat ggt gcc acc tgt ggc ttc ttc cca atc gat gct 10077
 Met Ser Pro Glu Tyr Gly Ala Thr Cys Gly Phe Phe Pro Ile Asp Ala
 310 315 320

gta acc ctc gat tac atg cgt tta agc ggg cgc agc gaa gat cag gtc 10125

Val Thr Leu Asp Tyr Met Arg Leu Ser Gly Arg Ser Glu Asp Gln Val	
325 330 335	
gag ttg gtc gaa aaa tat gcc aaa gcg cag ggc atg tgg cgt aac ccg	10173
Glu Leu Val Glu Lys Tyr Ala Lys Ala Gln Gly Met Trp Arg Asn Pro	
340 345 350	
ggc gat gaa cca att ttt acc agt acg tta gaa ctg gat atg aat gac	10221
Gly Asp Glu Pro Ile Phe Thr Ser Thr Leu Glu Leu Asp Met Asn Asp	
355 360 365	
gtt gaa gcg agc ctg gca ggg cct aaa cgc cca cag gat cgc gtt gca	10269
Val Glu Ala Ser Leu Ala Gly Pro Lys Arg Pro Gln Asp Arg Val Ala	
370 375 380 385	
ctg ccc gat gta cca aaa gca ttt gcc gcc agt aac gaa ctg gaa gtg	10317
Leu Pro Asp Val Pro Lys Ala Phe Ala Ala Ser Asn Glu Leu Glu Val	
390 395 400	
aat gcc acg cat aaa gat cgc cag ccg gtc gat tat gtt atg aac gga	10365
Asn Ala Thr His Lys Asp Arg Gln Pro Val Asp Tyr Val Met Asn Gly	
405 410 415	
cat cag tat cag tta cct gat gcc gct gtg gtc att gct gcg ata acc	10413
His Gln Tyr Gln Leu Pro Asp Gly Ala Val Val Ile Ala Ala Ile Thr	
420 425 430	
tcg tgc acc aac acc tct aac cca agt gtg ctg atg gcc gca gcc ttg	10461
Ser Cys Thr Asn Thr Ser Asn Pro Ser Val Leu Met Ala Ala Gly Leu	
435 440 445	
ctg gcg aaa aaa gcc gta act ctg gcc ctc aag cgg caa cca tgg gtc	10509
Leu Ala Lys Lys Ala Val Thr Leu Gly Leu Lys Arg Gln Pro Trp Val	
450 455 460 465	
aaa gcg tcg ctg gca ccg ggt tcg aaa gtc gtt tct gat tat ctg gca	10557
Lys Ala Ser Leu Ala Pro Gly Ser Lys Val Val Ser Asp Tyr Leu Ala	
470 475 480	
aaa gcg aaa ctg aca ccg tat ctc gac gaa ctg ggg ttt aac ctt gtg	10605
Lys Ala Lys Leu Thr Pro Tyr Leu Asp Glu Leu Gly Phe Asn Leu Val	
485 490 495	
gga tac ggt tgt acc acc tgt att ggt aac tct ggg ccg ctg ccc gat	10653
Gly Tyr Gly Cys Thr Thr Cys Ile Gly Asn Ser Gly Pro Leu Pro Asp	
500 505 510	
cct atc gaa acg gca atc aaa aaa agc gat tta acc gtc ggt gcg gtg	10701
Pro Ile Glu Thr Ala Ile Lys Lys Ser Asp Leu Thr Val Gly Ala Val	
515 520 525	
ctg tcc gcc aac cgt aac ttt gaa gcc cgt atc cat ccg ctg gtt aaa	10749
Leu Ser Gly Asn Arg Asn Phe Glu Gly Arg Ile His Pro Leu Val Lys	
530 535 540 545	
act aac tgg ctg gcc tcg ccg ccg ctg gtg gtt gcc tat gcg ctg gcg	10797
Thr Asn Trp Leu Ala Ser Pro Pro Leu Val Val Ala Tyr Ala Leu Ala	

550	555	560	
gga aat atg aat atc aac ctg gct tct gag cct atc ggc cat gat cgc Gly Asn Met Asn Ile Asn Leu Ala Ser Glu Pro Ile Gly His Asp Arg 565 570 575			10845
aaa ggc gat ccg gtt tat ctg aaa gat atc tgg cca tcg gca caa gaa Lys Gly Asp Pro Val Tyr Leu Lys Asp Ile Trp Pro Ser Ala Gln Glu 580 585 590			10893
att gcc cgt gcg gta gaa caa gtc tcc aca gaa atg ttc cgc aaa gag Ile Ala Arg Ala Val Glu Gln Val Ser Thr Glu Met Phe Arg Lys Glu 595 600 605			10941
tac gca gaa gtt ttt gaa ggc aca gca gag tgg aag gga att aac gtc Tyr Ala Glu Val Phe Glu Gly Thr Ala Glu Trp Lys Gly Ile Asn Val 610 615 620 625			10989
aca cga tcc gat acc tac ggt tgg cag gag gac tca acc tat att cgc Thr Arg Ser Asp Thr Tyr Gly Trp Gln Glu Asp Ser Thr Tyr Ile Arg 630 635 640			11037
tta tcg cct ttc ttt gat gaa atg cag gca aca cca gca cca gtg gaa Leu Ser Pro Phe Phe Asp Glu Met Gln Ala Thr Pro Ala Pro Val Glu 645 650 655			11085
gat att cac ggt gcg cgg atc ctc gca atg ctg ggg gat tca gtc acc Asp Ile His Gly Ala Arg Ile Leu Ala Met Leu Gly Asp Ser Val Thr 660 665 670			11133
act gac cat atc tct ccg gcg ggc agt att aag ccc gac agc cca gcg Thr Asp His Ile Ser Pro Ala Gly Ser Ile Lys Pro Asp Ser Pro Ala 675 680 685			11181
ggt cga tat cta caa ggt cgg ggt gtt gag cga aaa gac ttt aac tcc Gly Arg Tyr Leu Gln Gly Arg Gly Val Glu Arg Lys Asp Phe Asn Ser 690 695 700 705			11229
tac ggt tcg ccg cgt ggt aac cat gaa gtg atg atg cgc ggc acc ttc Tyr Gly Ser Arg Arg Gly Asn His Glu Val Met Met Arg Gly Thr Phe 710 715 720			11277
gcc aat att cgc atc cgt aat gaa atg gtg cct ggc gtt gaa ggg ggg Ala Asn Ile Arg Ile Arg Asn Glu Met Val Pro Gly Val Glu Gly Gly 725 730 735			11325
atg acg ccg cat tta cct gac agc gac gta gtc tct att tat gat gct Met Thr Arg His Leu Pro Asp Ser Asp Val Val Ser Ile Tyr Asp Ala 740 745 750			11373
gcg atg cgc tat aag cag gag caa acg ccg ctg gcg gtg att gcc ggg Ala Met Arg Tyr Lys Gln Glu Gln Thr Pro Leu Ala Val Ile Ala Gly 755 760 765			11421
aaa gag tat gga tca ggc tcc agt cgt gac tgg gcg gca aaa ggt ccg Lys Glu Tyr Gly Ser Gly Ser Ser Arg Asp Trp Ala Ala Lys Gly Pro 770 775 780 785			11469

cgt ctg ctt ggt att cgt gtg gtg att gcc gaa tcg ttt gaa cga att 11517
 Arg Leu Leu Gly Ile Arg Val Val Ile Ala Glu Ser Phe Glu Arg Ile
 790 795 800

cac cgt tcg aat tta att ggc atg ggc atc ctg ccg ctg gaa ttt ccg 11565
 His Arg Ser Asn Leu Ile Gly Met Gly Ile Leu Pro Leu Glu Phe Pro
 805 810 815

caa ggc gta acg cgt aaa acg tta ggg cta acc ggg gaa gag aag att 11613
 Gln Gly Val Thr Arg Lys Thr Leu Gly Leu Thr Gly Glu Glu Lys Ile
 820 825 830

gat att ggc gat ctg caa aac cta caa ccc ggc gcg acg gtt ccg gtg 11661
 Asp Ile Gly Asp Leu Gln Asn Leu Gln Pro Gly Ala Thr Val Pro Val
 835 840 845

acg ctt acg cgc gcg gat ggt agc cag gaa gtc gta ccc tgc cgt tgt 11709
 Thr Leu Thr Arg Ala Asp Gly Ser Gln Glu Val Val Pro Cys Arg Cys
 850 855 860 865

cgt atc gac acc gcg acg gag ttg acc tac tac cag aac gac ggc att 11757
 Arg Ile Asp Thr Ala Thr Glu Leu Thr Tyr Tyr Gln Asn Asp Gly Ile
 870 875 880

ttg cat tat gtc att cgt aat atg ttg aag taa caactatttg cttgccgggtt 11810
 Leu His Tyr Val Ile Arg Asn Met Leu Lys
 885 890

atattgcttc cggcaagcaa atgaattaca caatgcaaga 11850

<210> 47

<211> 891

<212> PRT

<213> Escherichia coli

<400> 47

Met Ser Ser Thr Leu Arg Glu Ala Ser Lys Asp Thr Leu Gln Ala Lys
 1 5 10 15

Asp Lys Thr Tyr His Tyr Tyr Ser Leu Pro Leu Ala Ala Lys Ser Leu
 20 25 30

Gly Asp Ile Thr Arg Leu Pro Lys Ser Leu Lys Val Leu Leu Glu Asn
 35 40 45

Leu Leu Arg Trp Gln Asp Gly Asn Ser Val Thr Glu Glu Asp Ile His
 50 55 60

Ala Leu Ala Gly Trp Leu Lys Asn Ala His Ala Asp Arg Glu Ile Ala
 65 70 75 80

Tyr Arg Pro Ala Arg Val Leu Met Gln Asp Phe Thr Gly Val Pro Ala
 85 90 95

Val Val Asp Leu Ala Ala Met Arg Glu Ala Val Lys Arg Leu Gly Gly

100					105					110						
Asp	Thr	Ala	Lys	Val	Asn	Pro	Leu	Ser	Pro	Val	Asp	Leu	Val	Ile	Asp	
115					120					125						
His	Ser	Val	Thr	Val	Asp	Arg	Phe	Gly	Asp	Asp	Glu	Ala	Phe	Glu	Glu	
130					135					140						
Asn	Val	Arg	Leu	Glu	Met	Glu	Arg	Asn	His	Glu	Arg	Tyr	Val	Phe	Leu	
145					150					155					160	
Lys	Trp	Gly	Lys	Gln	Ala	Phe	Ser	Arg	Phe	Ser	Val	Val	Pro	Pro	Gly	
165					170					175						
Thr	Gly	Ile	Cys	His	Gln	Val	Asn	Leu	Glu	Tyr	Leu	Gly	Lys	Ala	Val	
180					185					190						
Trp	Ser	Glu	Leu	Gln	Asp	Gly	Glu	Trp	Ile	Ala	Tyr	Pro	Asp	Thr	Leu	
195					200					205						
Val	Gly	Thr	Asp	Ser	His	Thr	Thr	Met	Ile	Asn	Gly	Leu	Gly	Val	Leu	
210					215					220						
Gly	Trp	Gly	Val	Gly	Gly	Ile	Glu	Ala	Glu	Ala	Ala	Met	Leu	Gly	Gln	
225					230					235					240	
Pro	Val	Ser	Met	Leu	Ile	Pro	Asp	Val	Val	Gly	Phe	Lys	Leu	Thr	Gly	
245					250					255						
Lys	Leu	Arg	Glu	Gly	Ile	Thr	Ala	Thr	Asp	Leu	Val	Leu	Thr	Val	Thr	
260					265					270						
Gln	Met	Leu	Arg	Lys	His	Gly	Val	Val	Gly	Lys	Phe	Val	Glu	Phe	Tyr	
275					280					285						
Gly	Asp	Gly	Leu	Asp	Ser	Leu	Pro	Leu	Ala	Asp	Arg	Ala	Thr	Ile	Ala	
290					295					300						
Asn	Met	Ser	Pro	Glu	Tyr	Gly	Ala	Thr	Cys	Gly	Phe	Phe	Pro	Ile	Asp	
305					310					315					320	
Ala	Val	Thr	Leu	Asp	Tyr	Met	Arg	Leu	Ser	Gly	Arg	Ser	Glu	Asp	Gln	
325					330					335						
Val	Glu	Leu	Val	Glu	Lys	Tyr	Ala	Lys	Ala	Gln	Gly	Met	Trp	Arg	Asn	
340					345					350						
Pro	Gly	Asp	Glu	Pro	Ile	Phe	Thr	Ser	Thr	Leu	Glu	Leu	Asp	Met	Asn	
355					360					365						
Asp	Val	Glu	Ala	Ser	Leu	Ala	Gly	Pro	Lys	Arg	Pro	Gln	Asp	Arg	Val	
370					375					380						
Ala	Leu	Pro	Asp	Val	Pro	Lys	Ala	Phe	Ala	Ala	Ser	Asn	Glu	Leu	Glu	
385					390					395					400	
Val	Asn	Ala	Thr	His	Lys	Asp	Arg	Gln	Pro	Val	Asp	Tyr	Val	Met	Asn	

405								410				415			
Gly	His	Gln	Tyr	Gln	Leu	Pro	Asp	Gly	Ala	Val	Val	Ile	Ala	Ala	Ile
420								425				430			
Thr	Ser	Cys	Thr	Asn	Thr	Ser	Asn	Pro	Ser	Val	Leu	Met	Ala	Ala	Gly
435								440				445			
Leu	Leu	Ala	Lys	Lys	Ala	Val	Thr	Leu	Gly	Leu	Lys	Arg	Gln	Pro	Trp
450								455				460			
Val	Lys	Ala	Ser	Leu	Ala	Pro	Gly	Ser	Lys	Val	Val	Ser	Asp	Tyr	Leu
465								470				475			
Ala	Lys	Ala	Lys	Leu	Thr	Pro	Tyr	Leu	Asp	Glu	Leu	Gly	Phe	Asn	Leu
485								490				495			
Val	Gly	Tyr	Gly	Cys	Thr	Thr	Cys	Ile	Gly	Asn	Ser	Gly	Pro	Leu	Pro
500								505				510			
Asp	Pro	Ile	Glu	Thr	Ala	Ile	Lys	Lys	Ser	Asp	Leu	Thr	Val	Gly	Ala
515								520				525			
Val	Leu	Ser	Gly	Asn	Arg	Asn	Phe	Glu	Gly	Arg	Ile	His	Pro	Leu	Val
530								535				540			
Lys	Thr	Asn	Trp	Leu	Ala	Ser	Pro	Pro	Leu	Val	Val	Ala	Tyr	Ala	Leu
545								550				555			
Ala	Gly	Asn	Met	Asn	Ile	Asn	Leu	Ala	Ser	Glu	Pro	Ile	Gly	His	Asp
565								570				575			
Arg	Lys	Gly	Asp	Pro	Val	Tyr	Leu	Lys	Asp	Ile	Trp	Pro	Ser	Ala	Gln
580								585				590			
Glu	Ile	Ala	Arg	Ala	Val	Glu	Gln	Val	Ser	Thr	Glu	Met	Phe	Arg	Lys
595								600				605			
Glu	Tyr	Ala	Glu	Val	Phe	Glu	Gly	Thr	Ala	Glu	Trp	Lys	Gly	Ile	Asn
610								615				620			
Val	Thr	Arg	Ser	Asp	Thr	Tyr	Gly	Trp	Gln	Glu	Asp	Ser	Thr	Tyr	Ile
625								630				635			
Arg	Leu	Ser	Pro	Phe	Phe	Asp	Glu	Met	Gln	Ala	Thr	Pro	Ala	Pro	Val
645								650				655			
Glu	Asp	Ile	His	Gly	Ala	Arg	Ile	Leu	Ala	Met	Leu	Gly	Asp	Ser	Val
660								665				670			
Thr	Thr	Asp	His	Ile	Ser	Pro	Ala	Gly	Ser	Ile	Lys	Pro	Asp	Ser	Pro
675								680				685			
Ala	Gly	Arg	Tyr	Leu	Gln	Gly	Arg	Gly	Val	Glu	Arg	Lys	Asp	Phe	Asn
690								695				700			
Ser	Tyr	Gly	Ser	Arg	Arg	Gly	Asn	His	Glu	Val	Met	Met	Arg	Gly	Thr

705	710	715	720
Phe Ala Asn Ile Arg Ile Arg Asn Glu Met Val Pro Gly Val Glu Gly	725	730	735
Gly Met Thr Arg His Leu Pro Asp Ser Asp Val Val Ser Ile Tyr Asp	740	745	750
Ala Ala Met Arg Tyr Lys Gln Glu Gln Thr Pro Leu Ala Val Ile Ala	755	760	765
Gly Lys Glu Tyr Gly Ser Gly Ser Ser Arg Asp Trp Ala Ala Lys Gly	770	775	780
Pro Arg Leu Leu Gly Ile Arg Val Val Ile Ala Glu Ser Phe Glu Arg	785	790	795
Ile His Arg Ser Asn Leu Ile Gly Met Gly Ile Leu Pro Leu Glu Phe	805	810	815
Pro Gln Gly Val Thr Arg Lys Thr Leu Gly Leu Thr Gly Glu Glu Lys	820	825	830
Ile Asp Ile Gly Asp Leu Gln Asn Leu Gln Pro Gly Ala Thr Val Pro	835	840	845
Val Thr Leu Thr Arg Ala Asp Gly Ser Gln Glu Val Val Pro Cys Arg	850	855	860
Cys Arg Ile Asp Thr Ala Thr Glu Leu Thr Tyr Tyr Gln Asn Asp Gly	865	870	875
Ile Leu His Tyr Val Ile Arg Asn Met Leu Lys	885	890	

<210> 48

<211> 10466

<212> DNA

<213> Escherichia coli

<400> 48

actatttgct tgccggttat tttgcttcg gcaagcaaat gaattacaca atgcaagagg 60

gttatttggt cagcaaatgg cccattttct cggctttggt atcgagataa tggtcgttat 120

tggggttacg acctacaatc aatggtagcg gttcaacaat attaatccct gcttcggtca 180

gaatttcgac ttttttcggg ttattggtta acaagcggac ttcattgacg ccaaggagtt 240

tgaacatata agcgcaaaga gtgaagtcgc gtcctcagc ggcgaagcct aactggtggt 300

tagcctctac ggtatcgtaa ccttgatcct gcagtgcgta agcgcggatt ttattcagca 360

gaccaatggt acgaccttcc tgacggtgat acagcaaaat accacggcct tcctcggcaa 420

tttgcgtcaa tgccgcttcg agctggaagc cacaatcgca ggcgaagctg aacagggcgt 480

caccggtcag acattcgga tggacgcgcg caagtaccgg ggtatgcccg gaaatatcgc 540
catagactag cgcgacatga tcgtgtccgg ttgccagttc ttcaaatacc accatcagga 600
aatcgcccca tgggggtggc agtttggctt ctgccacacg ttaagctgc atgaaattct 660
ccagataatg ctggttctgt attggcttat tttgccataa cgagaagggg ttcacctaat 720
cacgacgcgt cgatcgttca cggaatggca caaatctgtc aatttttcct ggaactggcg 780
ttttcagtta tgattgtggg acttatcaaa aaggagaggc catgcgttcg attgccagac 840
gtaccgcagt gggagctgca ctattgcttg tcatgccagt agccgtatgg atttctggct 900
ggcgttggca acctggagaa caaagttggc tactaaaagc ggctttttgg gttactgaaa 960
ctgtcaccca gccctggggc gtcattacac atttgatttt attcggctgg tttctctggt 1020
gtctgcgttt tcgcattaag gctgcctttg tattatttgc cattctggcg gccgcaatcc 1080
ttgtgggaca aggcgttaaa tcctggatca aagacaaagt ccaggaacca cgacctttg 1140
ttatctggct ggaaaaaaca catcatattc cggttgatga gttctacact ttaaagcgag 1200
cagaacgcgg aatatctagt aaagaacagt tggctgaaga gaaaaatatc ccacaatatt 1260
tgcggtcaca ctggcagaaa gagacggggg ttgcctttcc ttccggtcac acgatgtttg 1320
ctgccagttg ggcaactgct gccgttggtt tgctgtggcc gcgtcggcga acgttaacca 1380
ttgctatctt gctggtctgg gcaacgggag tcatgggaag ccgctgctg ctcgggatgc 1440
attggccacg cgatctggta gtagctacgt tgatttcgtg ggcgctggtg gcggtggcaa 1500
cgtggcttgc gcaacgaatt tgtgggcat taacaccacc tgcggaagaa aatcgcgaaa 1560
tagcgcaacg agaacaagaa agttaacgct ggttgatttt ccgaatttag cccttaaate 1620
atcaacaatg cgtgtggatg ccatttcgca gacggcgcga aaatggtact ttaaagggct 1680
attgcggtaa gttgaccata atttattcgc tctaaccaca taacgggaag taatgtgaaa 1740
tatttactca ttttcttact ggtgttagcg atcttcgtga tttcggtcac gttgggtgcg 1800
cagaacgata aacaggtgac gtttaattat ctgttagcgc aaggggagta ccgtatttcc 1860
acattgctgg cggatattgt tgctgcgggg tttgctatcg gttggttgat ttgtggcctg 1920
ttctggctgc gagttcgtgt ttccctggcg cgcgctgaac gtaaaataaa gcgactggaa 1980
aaccagcttt caccgcgcac tgacgtggct gtagtgccgc actcgtcagc ggogaaggaa 2040
taactttcta tgctggagtt gttgtttctg cttttgctg tagccgctgc ctatggctgg 2100
tatatgggcc gcagaagtgc gcaacaaaac aagcaagatg aagccaaccg cttgtcgcgt 2160

tgatggtgtg gtgtgttctg ctcaggaagc tgtgcgcttt aaacaggtat tcggtcagga 3960
 gttcaaactg gttacgcggg gcattcgctc gcaggggagt gaagctggtg accagcgccg 4020
 cattatgacg ccagaacagg cgttgctggc tgggtgtgat tatatggtga ttggtcgccc 4080
 ggtaacgcaa tcggtagatc cagcgcagac gctgaaagcg atcaacgcct ctttacagcg 4140
 gagtgcattg tgagtgattc caacagcogt ctggtctact caacggaaac cggacgtatt 4200
 gatgagccca aagcggcccc tgtacgcctt aaaggcgacg gtgtggtgcg tattcagcgt 4260
 cagaccagtg gacgtaaagg taaggcggtt tgcttgatta ccggtgtcga tctcgatgat 4320
 gccgaactga caaaacttgc agcgggaactg aagaaaaaat gcggtgctcg cgagcagtt 4380
 aaagatggag ttattgaaat ccaggcgcat aagcgtgatt tattaaaatc actacttgaa 4440
 gcgaaagga tgaaggtaaa actcgcaggc ggttaacata aaaagccacg gatatatccg 4500
 tggctttcga atattttact gtgcgtatta ttcagttatt tcgtactgaa cagaatcaag 4560
 cgtattataa ttgcgagtcg ataatcgaca tttatttacg attatttacc gacctggtga 4620
 ccaataacac ctccgacagc tgcaccacct aatgtacca acgtactgcc atcggtcagt 4680
 actgcaccgc ctaatgcccc tgcaccgcg ccgattgcgg tgttgoggtc ccgtttagac 4740
 cagttagaac aggcactcag agacattgcc aaagtaattg ccagaacagc cgcggtcatt 4800
 tttttgctcg ttacaaacat aatactctct cctgaattta tgattcacgg aagtaagctc 4860
 tctataacta taatagctaa gaataagtct ggtgaaatta ttccgtgaaa tctgctcgcg 4920
 cgcagggtta tatcacgcag gtgataatga ctctctgtta tatcgtgat aataatttta 4980
 tatcttgaga gtgttaataa caggtaaata gtcttaatta tcaaccagga atcatcttag 5040
 agcggatgat ctgccaaact gcaaatcatc cgtagagaag ggaaatggtt aaatgtcaac 5100
 gacgtgaatg gtgagtttac tgtgctcaag atgcatcaga tcgctggcgc gtattttcga 5160
 atcggtaatc acgcgattga atcgctcaac gggaccgatg gagtatgaat gtacagcacc 5220
 aaatttogag ctgtcagtcg ggactatcgc ttgcactct tttccagca cggcattgac 5280
 cacatcggtg cgcacatcat cgcgaccggt aaatccagtt tcaggttgcc agccatcaat 5340
 accaataaat gctttgctga aatgcacctg ttggatgcac tggcgtgtca aaggccaac 5400
 catactttcg ctttttttct gatacagcc accgagcaaa ataacttcac aaggcgcgtc 5460
 tttcagcaaa tgcgcgatgt agctgctgac cgtgatgata gtgacatttt tcttctgctc 5520
 gccagagtc cgggcgagta gggcattgct gctgccattt tcgataaaga tggtttcgcc 5580


```

aatgcggctg tgcaggaaac cagttggttg cgcgtccagt tcacgaogca gtttgcagaa 9060
accgtccagc gtgagcactt cttcggcatc gacatgcaga ccgtgcgttt tcagcaacgc 9120
tgccagcgcg tcggcattcg ccggatcaaa gcccatatgc acgttataga tgccaaaacc 9180
gagcttatcg cgcagtagcg gggccgcaca aatgttagcg gcaatcatcg cttcttcgac 9240
gatacggttg gcaatgcgac gaggtctggc gacgatatcc agcacttcac ctttttcacc 9300
gagaataaag cggtaatccg ggcgatcttt aaacaccagt gcgtggttat gacgccactc 9360
gccgcggcgt tggcaaattt gcgctagcaa acggacttgt tcggcaattg cttcaacttc 9420
aggctgccag tcaccggtat tttccagcca gtcagaaaacc tggtcataca ccagctttgc 9480
tttggttcg atggtggcgg caaagaattc gatattatct tcaatgggtg catcagcgga 9540
gagcgtcatg cggcatgcca gtaccgggcg gacttcattg gcgcgcagtg agcagagatc 9600
gtcagaaaagc tcgcgaggca gcatagggat gttgaagcca ggcagatagt tggatgaatgc 9660
gcgaattttc gcggctttgt ccagcttgct gccttcagca atccacgcgg ttggatcggc 9720
aatgccaca atcagctgaa gtttgtcatc cggcaacgcc ttagcgaaaa ggcggtcatc 9780
catatcttct gtgctggcac tgtcgatggt gacaaaatcc agcgcggtca gatcttcacg 9840
aaccagacct tcacgcagca tttcggtagc gacgccgtct ggtgcttctt tttccagatt 9900
atggcgtgca agggtaacct accacggtac aaagtgatcg tcacaaaaag tgatgtattg 9960
tgtcagttct gcatagaaag aacgatcgcc tttcagcgga tgacggcgca tttcggcaac 10020
cgcccagtcg ccttctttta actcgtggtt caggccacgg gctgcgcggc aaggaatggc 10080
gtcttttaag agtggatgat caggaacgat ggccagacgg tcatttttgc cctgaacctt 10140
accacgaaa cgagtcagga acggttcaac cagttcttct ggctctgcgg attcacgttc 10200
tttttactg tggatcacgc cgataattcg gtcgccatgc atgacttttt tcatctgcgg 10260
cggcggaatg aaataacttt tttgcgcgtc gacttcagg aagccaaagc ctttttctgt 10320
ggcttttacc accccttcag cgcgtggcgt ctgggaatgc agttgctgtt taagctgcgc 10380
tagcagcggg ttgtcctgaa acataattgt ctattttggt ggccattaga gcggctgaca 10440
gttttacgcg aatctgtctg acgcgg                                     10466

```

<210> 49

<211> 196

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 62-652 of seq id 48

<400> 49

```

Met Gln Leu Lys Arg Val Ala Glu Ala Lys Leu Pro Thr Pro Trp Gly
 1          5          10          15

Asp Phe Leu Met Val Gly Phe Glu Glu Leu Ala Thr Gly His Asp His
      20          25          30

Val Ala Leu Val Tyr Gly Asp Ile Ser Gly His Thr Pro Val Leu Ala
      35          40          45

Arg Val His Ser Glu Cys Leu Thr Gly Asp Ala Leu Phe Ser Leu Arg
      50          55          60

Cys Asp Cys Gly Phe Gln Leu Glu Ala Ala Leu Thr Gln Ile Ala Glu
      65          70          75          80

Glu Gly Arg Gly Ile Leu Leu Tyr His Arg Gln Glu Gly Arg Asn Ile
      85          90          95

Gly Leu Leu Asn Lys Ile Arg Ala Tyr Ala Leu Gln Asp Gln Gly Tyr
      100          105          110

Asp Thr Val Glu Ala Asn His Gln Leu Gly Phe Ala Ala Asp Glu Arg
      115          120          125

Asp Phe Thr Leu Cys Ala Asp Met Phe Lys Leu Leu Gly Val Asn Glu
      130          135          140

Val Arg Leu Leu Thr Asn Asn Pro Lys Lys Val Glu Ile Leu Thr Glu
      145          150          155          160

Ala Gly Ile Asn Ile Val Glu Arg Val Pro Leu Ile Val Gly Arg Asn
      165          170          175

Pro Asn Asn Glu His Tyr Leu Asp Thr Lys Ala Glu Lys Met Gly His
      180          185          190

Leu Leu Asn Lys
      195

```

<210> 50

<211> 11471

<212> DNA

<213> Escherichia coli

<400> 50

```

ttttaacaaa ataagttgcg ctgtactgtg cgcgcaacga cattttgtcc gagtcgtgag 60
gtactgaaat ggcaatacaa caccctgaca tccagcctgc tgtaaccat agcgttcagg 120
tggcgatcgc tgggtccggc cgggttgggc tgatgatggc gaactatctc ggccagatgg 180
gcattgacgt gctggtggtg gagaaactcg ataagttgat cgactaccog cgtgcgattg 240

```


atttagcgcc ggaatactcg gtttgctacc cggcgcgttg gttggcgga tgctggcgga 7140
 ccgttatggt cgcaagcgca ttttgattgg ctcaattgctg ctgtttgggt tgttctcact 7200
 ggcaacggcg attgcctggg atttccctc actggtcttt gcgcggctga tgaccggtgt 7260
 cgggctgggg gcggcggtgc cgaatcttat cgcctgacg tctgaagccg cgggtccacg 7320
 ttttcgtggg acggcagtga gcctgatgta ttgcggtgtt cccattggcg cggcgctggc 7380
 ggcgacactg ggtttcgcgg gggcaactt agcatggcaa acggtgtttt gggtaggtgg 7440
 tgtggtgccg ttgattctgg tgccgctatt aatgcgctgg ctgccggagt cggcggtttt 7500
 cgctggcgaa aaacagtctg cgcaccact gcgtgcctta tttgcgccag aaacggcaac 7560
 cggacgctg ctgctgtggt tgtgttattt cttcactctg ctggtggtct acatgttgat 7620
 caactggcta ccgctacttt tggtaggca aggattccag ccatcgacg cggcaggggt 7680
 gatgtttgcc ctgcaaatgg gggcggcaag cgggacgtta atgttggcg cattgatgga 7740
 taagctgcgt ccagtaacca tgctgctact gatttatagc ggcatgttag cttcgtctgt 7800
 ggcgcttgga acggtgtcgt catttaacgg tatgttctg gcgggatttg tcgcgggggt 7860
 gtttgcgaca ggtgggcaaa gcgttttgta tgccctggca ccgttgtttt acagtgcga 7920
 gatccgcgca acaggtgtgg gaacagccgt ggcggtaggg cgtctggggg ctatgagcgg 7980
 tccgttactg gcgggaaaa tgctggcatt aggcactggc acggtcggcg taatggccgc 8040
 ttctgcaccg ggtattcttg ttgctgggtt ggcggtgttt attttgatga gccggagatc 8100
 acgaatacag ccgtgcgcg atgcctgacg tgccttatta ggcagggcg aaagggactt 8160
 caccacaata cacctacggc gtttacaggt atactcgta aaaattattc agcgggtttg 8220
 gaaacaaaga tggcaaaact taccttaca gagcagttgc tcaaagcagg attagtcacc 8280
 agcaaaaaag cggcgaaggt ggagagaacg gcgaaaaaat cgcgcgttca ggcgcgtgaa 8340
 gctcgggcg cggtagaaga aaataaaaag gcacagcttg agcgtgataa acagcttagc 8400
 gaacagcaaa aacaagcggc gttggcgaaa gaatataaag ctcaggtgaa gcagcttatt 8460
 gaaatgaacc gaatcaccat tgccaatggc gatattggtt ttaacttcac tgacggcaat 8520
 ctgattaaga agatttttgt cgataagctc acacaggcgc agttgattaa tggctgctctg 8580
 gcgattgcc gcttggtggt cgataacaat agcgaaggtg aatacgccat tattcccgcc 8640
 agcgttgccg ataaaattgc tcagcgcgat gccagcagta tagtggtgca cagcgcgctc 8700
 agcggcgaag agcaggatga agacgaccg tatgccgact tcaaagtgcc tgatgatttg 8760
 atgtggtaaa catagataag tcgtgcgcg atgcctgatg cgacgctatg cgcgtcttat 8820

cgccaatacc ggtgggtcacg ccacagccca gcaggcagac gtgttcacg tttgcttctg 10560
 gattaatttt tgccagagac acttccgcga ctacggtgta ttactgaat gtagagcacc 10620
 ccatgtagtg ataaagcggc tgcccgttgt aagaaaaacg ggtgggtgccg tctggcatca 10680
 ggcctttacc ctgggtttcg cgaaccgcaa cacagaggtt agttttgcc gaacgacaga 10740
 actcacactc gccgcactcc gcggtgtaaa gcgggatcac atggtcgcca ggtttgacgc 10800
 tggttacgcc ttcaccgact tcaaccacaa cgcgggcccc ttcgtgaccg agaaccaccg 10860
 ggaatacacc ctccgggtca tcgccggaga gggtaaagtc gtcggtatgg caaacgccgg 10920
 tatgggtgac ttaattagc acttcacott ttttcgggtg tgcaacgtca atttcaacga 10980
 tttccagcgg tttaccggga gaaaatgcaa cggcagcacg tgatttcac tctcgtctct 11040
 cctcaatatg gtaatagatt cagctattta agataggcac gaaccagttc aatagtgtcg 11100
 tcaacggatt ggctgacttc gcggtgtag cagtcatttc ggtcaaactt tcccggata 11160
 tggttttcaa gcaattctgc catcagccca ttagccgcgc cccgaacggc agcgatctgt 11220
 tggagtatgg caccgcatc gccatcacc tccagcgacc gttccagagc atcaatctgc 11280
 cccgaatac gacgaactcg agtaaggacc tttttcttct cttccggagt actgggcatt 11340
 tcgcacctca tcatctgcat gcaatatact ataggggggt attctatatg tcaatgcata 11400
 cccccctata gtatataaca ctggagaata aaatttatcc ggtgaatgtg gtcggaaaac 11460
 aaagaggaaa g 11471

<210> 51

<211> 98

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 11064-11360 of seq id 50

<400> 51

Met	Gln	Met	Met	Arg	Cys	Glu	Met	Pro	Ser	Thr	Pro	Glu	Glu	Lys	Lys
1				5				10						15	

Lys	Val	Leu	Thr	Arg	Val	Arg	Arg	Ile	Arg	Gly	Gln	Ile	Asp	Ala	Leu
			20					25					30		

Glu	Arg	Ser	Leu	Glu	Gly	Asp	Ala	Glu	Cys	Arg	Ala	Ile	Leu	Gln	Gln
		35					40					45			

Ile	Ala	Ala	Val	Arg	Gly	Ala	Ala	Asn	Gly	Leu	Met	Ala	Glu	Val	Leu
	50					55					60				

Glu	Ser	His	Ile	Arg	Glu	Thr	Phe	Asp	Arg	Asn	Asp	Cys	Tyr	Ser	Arg
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

65		70		75		80									
Glu	Val	Ser	Gln	Ser	Val	Asp	Asp	Thr	Ile	Glu	Leu	Val	Arg	Ala	Tyr
				85					90					95	

Leu Lys

<210> 52
 <211> 11095
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (2747)..(3292)

<400> 52
 ataatcctgc ttgaacaata aaagcgttat ggtaacgcct gcgattaacc cggaccagct 60
 attcattgcg atggcgcggg aagccaggct tcggtaaatt caaaccagcc gcgcggtgctc 120
 agtcgcacac cgttcacgcc gggaggggca ctaatgcgat agtgatagtt gaacagcggc 180
 gtcagcgctc catctgtcat taactggcta aaaaccgctt tcagggcatt aaatcggttt 240
 tcttcacag gcattatttg cacggcatcc agtgctgatt gtagatgtgc gtatgctgga 300
 gcgtcgaaaa catgtggcca cagcggatcg cagcgcagcc attgtccag agtatattcc 360
 ggtgcttcgc caattaatct gtcgcccata atgaggtctg cgtgtgcctg tagggctcgtg 420
 tcgtcccagt tttttgcgtt atgaaaaata attgtgagtt cacagccttc cgctgccagt 480
 gtcgcctgta ggcgttctgc catggtatga agttctatcg gtaggtgata aaccagcgtc 540
 aaggttttcg gtagtttgac ttcattccgg acctgccaat gcggaatagt ccagcctggc 600
 agtaatgcat gactggcggg gatcagggtt tctccgactt ctaacgtttg taataaaccg 660
 gattgatgaa taatggagat cacttttcgc gcctgccaga gggagagtcg gggacttttg 720
 cgcaacgtca aatagcaaaa acctaaactg atgccgctac tgacctggct gacctgttc 780
 agctcctccg gtttgccgat ggtgatttgc acgggatgcc gacaactggt tcccaaatct 840
 ttttcgaaaa gcggcggagt tatccagtac tcaaccgctt taagcagcgg atgacgtaaa 900
 tggtataaat catggctttc caggcgcacc agctctgctg tgaattgtgt taagcgaaaa 960
 ggacctgtgc cgatcagtgg gaattgcgga tgcgccagat ggctgcaata gctcgccagc 1020
 cgggtgcgcaa gccagtaatc agggcgatgt aaaaagaagg tcagacactg cggatgggtg 1080
 acttcaatac gtttcacgct aataaataat tgatccagtg ctggcagttg taacagcatc 1140

aataatcgct ggtgtaagtg tgaggctttt actgcatcgc cgttatgcca gtgtaggggtt 1200
gaacgaagat aaaagtccca gcgtaaccgc tcagtagagg tttcccagtg atgcgctaaa 1260
tcgccaatcg ggcgctgagt attattatcg aagcgggtca ggccggaaaa tatctgccc 1320
gcgagatgct gctcggcacg gccgggcaaa aagcctgggt gtagcgggtc gagcgggcga 1380
tagtagggaa tacgcaacgt ggggtgtatcg ttttgccatt gtccgcccac aaacggctgt 1440
aacagagtgc gcagctcacc tggggccagt tgcgccagct ccagcacatc ttgctgcttt 1500
ccggtttcca gtgcctgttc catcatcgca ttgcgtagcg attccggcgt gaccagaaag 1560
cgtaattgtc cgcgctttcc gcgtcctgac tgcgcctgcc actccagcca tcccgcctcc 1620
tgtgcctgac gcaacagcgt acgaacatgg cgttcgctgc aaaaacagcg ttcggccagt 1680
tcgctgacgg tgacggtttg cggctttccg gcggaagggt gccacagacg ttgatactgg 1740
ttaagacggt tgagcaatcg catataaacc cggaacaata ttattttaact attcactatt 1800
acttccgtat atatcagggtg atactcaatc accattaacc gtgtcacaga gtggagaaag 1860
aaatggctcg tctggcagca tttgatatgg atggcacttt attgatgccc gaccatcatt 1920
taggtgagaa aaccctctct actttggcgc gactgcgtga acgcgacatt accctcactt 1980
ttgccacggg gcgtcatgcg ctggagatgc agcatattct cggggcgcta tcgctggatg 2040
cgtatttgat taccggcaac ggaacgcgcg tgcattctct ggaagggtgaa cttttacatc 2100
gtgatgattt acctgcggat gtcgcggagc tgggtgctga tcagcaatgg gatacccgag 2160
ccagcatgca tatcttcaat gacgacggtt ggtttaccgg gaaagagatc cctgcgttgt 2220
tgcaggcatt tgtctatagc ggttttcgtt atcagataat cgatgtcaaa aaaatgccac 2280
tcggcagcgt caccaagatc tgcttctgtg gcgatcacga cgatcttaca cgcttgacga 2340
tccagctata cgaagcatta ggcgagcgtg cacatttggtg tttttccgcc acggattgcc 2400
tcgaagtgtt gccggtgggc tgcaataaag gcgctgcatt gacggtgctg acccaacatt 2460
taggtttatc gttgcgcgat tgcattggcct ttggtgatgc gatgaacgat cgcgaaatgt 2520
tagtcagcgt cggtagcgga tttattatgg gcaatgcgat gccgcaactg cgcgcggagc 2580
tccgcatttt accggtgatt ggacattgcc gaaatcaggc tgtctctcac tatttgacgc 2640
actggctgga ctatccacat ctaccttatt cccccgaata acgagatccc ttccagcacc 2700
gggcaattgc ccggtttttt ttgcgttgaa tttgtcattt tgtgcc gtg gtg ttt 2755
Val Val Phe
1
aaa ccg ccc aga ata aat tgt cgt gat ttc acc ttt aaa ata aaa tta 2803

19

tagtgcaaca gttgcgtacc gacgtgatgg atgctgcggtt acgccagcca ttaagcgagt 5432
 ttgataccca acccgtcggg cagggtgattt cccgcgtcac taatgacact gaagtgatcc 5492
 gcgatctcta cgttaccgta gtggcaactg tcttgcgcag tgccgcgctg gtgggcgcca 5552
 tgctgggtggc gatgttcage ctgcactggc gaatggcact ggtggcgata atgattttcc 5612
 cgggtggtgct ggtggtaatg gtgatatacc agcgttacag caccgccgatt gtccgtcgtg 5672
 tgcgcgccta tttggcggat atcaacgacg gctttaacga aatcatcaat ggcatgagcg 5732
 ttatccagca gtttcgtcag caggcgcgat ttggcgaacg tatgggggag gccagtcgtt 5792
 cacactatat ggcgaggatg caaacctgc gcctcgacgg ttttctgctg cgtccgctgc 5852
 tgagtctggt ttcacgctc attctttgtg gcttggtgat gctgtttggc ttctccgcca 5912
 gcggcaccat tgaagtgggc gtgctgtatg cgtttatcag ctatcttggg cgacttaacg 5972
 aaccattaat cgaactgacc acgcaacagg cgatgctgca acaggctggt gttgctgggtg 6032
 agcgcgtggt tgaactgatg gacggaccgc gccagcaata tggcaatgat gatcgcccgt 6092
 tacagagtgg caccatcgaa gtcgataacg tgtcatttgc ttatcgcgat gacaatctgg 6152
 tgctaaagaa cattaatctc tctgtgcctt cgcgcaattt tgtggcgctg gtcgggcata 6212
 ccggcagtgg caaaagcacc ctgccagtt tattgatggg ctattacccg ctaacggaag 6272
 gtgagattcg ccttgatggt cgtccattaa gttcgctaag tcacagcgcg ctgcgccagg 6332
 gcgtggcaat ggtgcagcaa gatccggtgg tgctggcgga taccttcctc gccaacgtga 6392
 cgctggggcg ggatatctcc gaagaacgcg tctggcaggc gctggaaacc gtgcaactgg 6452
 cggagctggc gcgtagcatg agcgacggta tttacacgcc gctgggagag caggggaata 6512
 atctctcagt tgggcaaaag caactgctgg cactggcgcg cgtgctggtc gagacgccgc 6572
 aaatcctgat ccttgatgag gcaaccgcca gcattgactc cggctactgaa caggcgattc 6632
 aacatgctct ggcggcgggtg cgtgaacata ccacgctggt agtgattgct caccgcttat 6692
 cgaccattgt tgatgccgac accattctgg tgcttcacg tgggcaagcc gtggagcagg 6752
 gcactacca gcaactgctg gcggcccagg gacgctactg gcagatgtat caactgcaac 6812
 ttgcgggcca agagctggca gccagcgtgc gtgaagagga atcattgagc gcctgaatag 6872
 cgcaatatct catcgttggg gcaaaaatgt aacgcactgt gcactgtcat agtgcgtttt 6932
 cattttcaaa cttcttaact tctgtctctc tttctcgttt ttcatctctg gcacaccgct 6992
 tgcaatacct tcttcgtgta gcagaacat taccgaattc tgaccggagg ggatctatga 7052

agctggtgac cgtgataatc aaaccattca agctggaaga cgttcgtgaa gcgttatctt 7112
 ccattggtat tcagggcctg accgtcaccg aagtgaagg tttcgggcgt cagaaagggc 7172
 atgccgagct gtaccggggg gcggaataca gcgtcaattt cctgccaaaa gtaaaaattg 7232
 atgtggcgat tgctgatgac caactcgatg aagtgatoga tatcgtcagt aaggcggtt 7292
 acaccgaaa aattggcgac ggcaaatct tcgtcgctga attgcaacgc gtcattcgta 7352
 ttcgtaccgg cgaagccgac gaagcggcgc tgtaatctct ggcacacagc aacaggaacg 7412
 aaaaatgaag atagcgacga taaaaactgg gcttgcttca ctggcgatgc ttccgggact 7472
 ggtaatggct gcacctgcgg tggccgataa agccgacaat gcgtttatga tgatttgtac 7532
 tgcgctggtg ctgtttatga ctattccggg gattgcctg ttttacggtg ggttgattcg 7592
 cggcaaaaac gtcgtgtcga tgctgacgca ggtgacggtg acatttgac tggtctgtat 7652
 tctctgggtg gtttacggtt actcgctggc gtttggtgag ggcaacaact tcttcggcaa 7712
 cattaactgg ttgatgctga aaaacatcga actgacggcg gtgatgggca gcatttatca 7772
 gtatatccac gtggcggttc agggatcggt tgctgcatt accgtcggct tgatagttgg 7832
 ggcgctggcg gaacgaatcc gcttctcagc tgtgttgatt ttcgtggtg tatggctgac 7892
 gctctcttac attccgattg cgcataatggt gtggggcggt ggttgctg cttctcacgg 7952
 tgcgctggat ttccgggtg gcaccgtggt gcacattaac gccgcaatcg ccggtctggt 8012
 gggcgctgat ctgataggaa aacgcgtggg cttcggtaaa gaggcgttta aaccgcacaa 8072
 cctgccgatg gtcttcaccg ggactgccat tctctatata ggttggtttg gctttaacgc 8132
 cgggtcagcg ggcacggcga atgaaatcgc ggcactggca tttgtgaata ctgtggtcgc 8192
 aacggcgcg gcaattcttg gctggatctt cggatgaatgg gcgctgcgtg gtaagccttc 8252
 actgctgggg gcgtgttctg gcgcgattgc cggctctggtc ggcgtgacgc cagcctgcgg 8312
 ctacattggg gttggcgcg cggttgattat cggcgtggtg gctggtctg cgggcttggt 8372
 gggcgttacc atgctcaaac gcttgctgcg ggtggatgat ccctgcgatg tcttcggtgt 8432
 gcacggcggt tgtggcattg tcggtgtgat catgaccggg atttttgccg ccagctcgct 8492
 gggcgcgctg ggcttcgctg aagggtgtgac gatgggcat cagttgctgg tacagctgga 8552
 aagcatcgcc attacgatcg tctggtccgg tgttggtggca tttatcggct acaaattggc 8612
 ggatctgacg gttggtctgc gtgtaccgga agagcaggag cgagaagggc tggatgtcaa 8672
 cagccacggc gagaatgcct ataacgcgta acaagcactg caaaaaacag ccggacgggt 8732
 ttcacctccg gctatTTTTT taattgtgat tacgcatcac cccttcctga acggtcgagg 8792

agctggtgac cgtgataatc aaaccattca agctggaaga cgttcgtgaa gcgttatctt 7112
 ccattggtat tcagggcctg accgtcaccg aagtgaagg tttcgggcgt cagaaagggc 7172
 atgccgagct gtaccggggg gcggaataca gcgtcaattt cctgccaaaa gtaaaaattg 7232
 atgtggcgat tgctgatgac caactcgatg aagtgatoga tatcgtcagt aaggcggtt 7292
 acaccgaaa aattggcgac ggcaaatct tcgtcgctga attgcaacgc gtcattcgta 7352
 ttcgtaccgg cgaagccgac gaagcggcgc tgtaatctct ggcacacagc aacaggaacg 7412
 aaaaatgaag atagcgacga taaaaactgg gcttgcttca ctggcgatgc ttccgggact 7472
 ggtaatggct gcacctgcgg tggccgataa agccgacaat gcgtttatga tgatttgtac 7532
 tgcgctggtg ctgtttatga ctattccggg gattgcctg ttttacggtg ggttgattcg 7592
 cggcaaaaac gtcgtgtcga tgctgacgca ggtgacggtg acatttgac tggtctgtat 7652
 tctctgggtg gtttacggtt actcgctggc gtttggtgag ggcaacaact tcttcggcaa 7712
 cattaactgg ttgatgctga aaaacatcga actgacggcg gtgatgggca gcatttatca 7772
 gtatatccac gtggcggttc agggatcggt tgctgcatt accgtcggct tgatagttgg 7832
 ggcgctggcg gaacgaatcc gcttctcagc tgtgttgatt ttcgtggtg tatggctgac 7892
 gctctcttac attccgattg cgcataatggt gtggggcggt ggttgctg cttctcacgg 7952
 tgcgctggat ttccgggtg gcaccgtggt gcacattaac gccgcaatcg ccggtctggt 8012
 gggcgctgat ctgataggaa aacgcgtggg cttcggtaaa gaggcgttta aaccgcacaa 8072
 cctgccgatg gtcttcaccg ggactgccat tctctatata ggttggtttg gctttaacgc 8132
 cgggtcagcg ggcacggcga atgaaatcgc ggcactggca tttgtgaata ctgtggtcgc 8192
 aacggcgcg gcaattcttg gctggatctt cggatgaatgg gcgctgcgtg gtaagccttc 8252
 actgctgggg gcgtgttctg gcgcgattgc cggctctggtc ggcgtgacgc cagcctgcgg 8312
 ctacattggg gttggcgcg cggttgattat cggcgtggtg gctggtctg cgggcttggt 8372
 gggcgttacc atgctcaaac gcttgctgcg ggtggatgat ccctgcgatg tcttcggtgt 8432
 gcacggcggt tgtggcattg tcggtgtgat catgaccggg atttttgccg ccagctcgct 8492
 gggcgcgctg ggcttcgctg aagggtgtgac gatgggcat cagttgctgg tacagctgga 8552
 aagcatcgcc attacgatcg tctggtccgg tgttggtggca tttatcggct acaaattggc 8612
 ggatctgacg gttggtctgc gtgtaccgga agagcaggag cgagaagggc tggatgtcaa 8672
 cagccacggc gagaatgcct ataacgcgta acaagcactg caaaaaacag ccggacgggt 8732
 ttcacctccg gctatTTTTT taattgtgat tacgcatcac cccttcctga acggtcgagg 8792

ctccccgata ccatcacacc ttctgccagt aatgcctgtc gctgacgctg taaatccggt 10532
 ccggttagcg aaattgtgcc gtggcgatta accacccggt gccagggtaa ggtgctgcct 10592
 tcagggagac gctttaacac accgcccacc tggcgcgcg cgcggggcga tcccgcaggt 10652
 ttgccacat caccgtaagt ggtgacatag ccttcgggaa tagcggcgac gatttgccag 10712
 acgcgttggg gaaatgaatc ttctttttcc atcttttctt cctgaggtaa tttttcagca 10772
 taatctggaa aaacgcccga gtgaagtcgc attgcgcaag aaaccagcat ctggcacgcg 10832
 atgggttgca attagccggg gcagcagtga taatgcgcct gcgcgttggt totcaacgct 10892
 ctcaatgggg gctctgttg ttctcccgca acgctactct gtttaccagg tcaggtccgg 10952
 aaggaagcag ccaaggcaga tgacgcgtgt gccgggatgt agctggcagg gccccaccc 11012
 atttctgct cccaccgttt cgtcaaaaaa tccaacatg gctaaacttt aaccacaact 11072
 gacgtcgcaa gaattgtctg gct 11095

<210> 53

<211> 181

<212> PRT

<213> Escherichia coli

<400> 53

Val Val Phe Lys Pro His Arg Ile Asn Cys Arg Asp Phe Thr Phe Lys
 1 5 10 15

Ile Lys Leu Lys Glu Lys Lys Ile Leu Cys Gly Arg Ala Met Leu Asp
 20 25 30

Lys Ile Asp Arg Lys Leu Leu Ala Leu Leu Gln Gln Asp Cys Thr Leu
 35 40 45

Ser Leu Gln Ala Leu Ala Glu Ala Val Asn Leu Thr Thr Thr Pro Cys
 50 55 60

Trp Lys Arg Leu Lys Arg Leu Glu Asp Asp Gly Ile Leu Ile Gly Lys
 65 70 75 80

Val Ala Leu Leu Asp Pro Glu Lys Ile Gly Leu Gly Leu Thr Ala Phe
 85 90 95

Val Leu Ile Lys Thr Gln His His Ser Ser Glu Trp Tyr Cys Arg Phe
 100 105 110

Val Thr Val Val Thr Glu Met Pro Glu Val Leu Gly Phe Trp Arg Met
 115 120 125

Ala Gly Glu Tyr Asp Tyr Leu Met Arg Val Gln Val Ala Asp Met Lys
 130 135 140

Arg Tyr Asp Glu Phe Tyr Lys Arg Leu Val Asn Ser Val Pro Gly Leu

145	150	155	160
Ser Asp Val Thr Ser Ser Phe Ala Met Glu Gln Ile Lys Tyr Thr Thr			
	165	170	175
Ser Leu Pro Ile Glu			
180			

<210> 54
 <211> 11756
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (4941)..(5417)

<400> 54
 atgggctcca caaaatgggg acatcaaaga aaagcagtgg cactaattaa gactgatgcc 60
 ctgcggaaaa gttctgcggt tgtgcaaaaa aatttcattt tcagggcaac ttcagtttta 120
 tctaatacct ggccatacca tgacgatgat tgtccctgcc agcgtcagca ggacgttggc 180
 gattgcatag gtgcccgcat agcccagcgc cgggatgtta ctgcgagctg tatcactgat 240
 gatctccatt gccggcgcg caggtagctgc gccatcatt gcgccgaaca acagcgcgcg 300
 gttcattcgc aatacataag caccgaacaa gaaacagata accacgggca ccagactgac 360
 aatcaatccg gcaatcaaca tctgacggcc aatcgcgccc aggcggttat taataccgct 420
 accggcgctc agaccaacgc ctgccataaa caccatcaag ccgaactctt tcaccatgct 480
 taatgcaccc tgcggaatgt aaccgaaggt cgggtgggta gcacgcataa agcccagcat 540
 aattccggcg aataacaacc cggcagcggt ccccatgccg aaactgaatg tgctgaactg 600
 gaaggtgatc atcccgatca tcagcccaat aacaaagaag gcgcagaatg ccagcaggtc 660
 agtgacctgg ctgtgaatcg agataaagcc gatgcgatcg gcgatggttt ttacgcggcg 720
 ggcatcgccg ctgacttgta aaacgtcacc tttgttaagc acgacgttgt catctatcgg 780
 catctcaatc tggctacgaa tgacgcggtt aaggaagcaa cagtgatcgg tcaacttcag 840
 ttgtgcgaga cgtttaccta cagcgttatg gtttttaacg accatttctt cagtgcgat 900
 acgcatgtcg agaaggtcac gatcgaaaac ttctttaccg ttacggaagc tgggatcgag 960
 tcgggcatgg gcgtcgggat agcctaccaa cgctatttca tcgcccattt gtagcacggc 1020
 atcaccgtct ggatttgcca gaatcccggt acgtcgaata cgttcaatgt agcagccggt 1080
 ttgtcgataa ataccaggt cagcagatt tttgcgctcg gtccaggcca ccagttccgg 1140

gccgacgcga taggcgcgga tcaccggtaa ataaacctta cggttggcat cagtgtccag 1200
 gccacgttcg cgggogattt gctgggcgct ggtctgtaag tctgatgct gcaatttcg 1260
 caagtaacgc gcaccaacaa tcaaactcac cagaccgatt aaataggta aggcataccc 1320
 gaggtcaga ttatccagt cagtgagag ctgcctgctt tccatgccg aatgacgcag 1380
 tgtatcgcca gcaccgacca gaaccggtgt cgacgtcata gagcctgcta acataccggc 1440
 cgtcaggcca atatcccagc caaacagctt acctaaccct aaggcgatca ccagcgcaact 1500
 gccaaaccatc accagtgcta acattaggta atttttccca tcgcgaaaaa aaatggaaaa 1560
 aaagtccggt ccggcttcga ccccgacgca gaaaataaac agcataaagc caagattaag 1620
 cgcacgggtg ttaatgctga aatgttggtg gcctaataac agcgatacga ctaaacgcc 1680
 aatggaatta ccagttgga tcgaaccaag tcgtaacttt ccgagacata gcccaagcgc 1740
 gaggaccaca aataataaca gaatgtaatt ccatttaac aattcggcga cgtttatatt 1800
 cacggaggct aacttctgt ttactagtaa gctgttgaaa gaaatggtaa ttacgataa 1860
 tgttttttac cagaattcag ggccgagatt cattcagcg acctaaacga tagtaaagta 1920
 acaatatatt ttactagtgt aatcacatta ggtatcaacg gctatatgaa ttgcgttggc 1980
 ctatattagc atggaatgcg aagcggcttt atcttactga acgccacact ggcgaaaaat 2040
 gtgttcgata gacgcagtgt caggaggaac gagtgaaaca taaacaacgt tggcgggggg 2100
 caatctgctg ttttgtctc ttcatgtgg tgtgcctttt tctggcgacg cacatgaaag 2160
 gcgcttttcg ggctgcggg catcctgaaa tcggcttgct atttttcatt ctctctggag 2220
 cagtcgccag ctctttttca cagcgtagag aagtctgaa acctctgtt ggcgcaatgc 2280
 tggcggcacc ctgttcgatg ctcatatgc ggctgttttt ttaccgacg cgctcattct 2340
 ggcaagagct ggcatggtta ctaagcgcg tgttctggtg tgcgctggg gcaactgtgt 2400
 tcttatttat cagtgtttg tttaaaccac agcacagaaa aaatcagtaa agccctcaac 2460
 gcgagggctt gtcagacgat caggcgtcca gattttcttt caccatgca gcaaatcgg 2520
 tatagccgcc gatatgttgc tgatcgacaa aaatctgcgg cacggtttct acgggtttac 2580
 ctgccttttg ttgtagatct tctttagtga tcccttcgc acgaatatct acatactgat 2640
 actgaaaatc atcgcgttca ttgtcaatt tctcagccag atcttttgca cgcacacagt 2700
 aagggaacc cgaacgacca aaaataacgg tttgcattat ttctctctc atagatttat 2760
 gcctgtaatg atcacgctaa aatgtattcg ctgaaagtag gtttaacctg ttgcattaat 2820
 tgctaaaagc tataactgtt aaacacaata cagtgaaaag ttttagactg aaggctcact 2880

1200 1260 1320 1380 1440 1500 1560 1620 1680 1740 1800 1860 1920 1980 2040 2100 2160 2220 2280 2340 2400 2460 2520 2580 2640 2700 2760 2820 2880

ggg	cga	aaga	gggc	gat	t t t t t	cgt	tcca	aatt	tgc	atc	gtg	cg	gcg	cg	gca	agc	gtc	gcc		4620
gtat	cac	acc	acagg	agc	gt	gaa	atc	gcga	taaa	agcc	gc	gcga	ac	gat	g	gcg	ctg	gg	acg	4680
ttg	ctg	ggt	gt	ggat	att	ctg	cgt	gcta	aatc	gcg	ggc	cgtt	ggt	gat	gg	agt	gc	gt		4740
cgcc	gg	ggg	gct	gga	agga	ata	gaaaa	aacca	ccg	gtat	cga	cat	cgc	ggg	gt	aaa	at	gat	ccc	4800
gct	gg	atc	ga	acgc	act	acg	acaga	aat	att	gc	ctg	aa	aac	ggg	tg	gt	tc	ga	aat	4860
cac	att	act	g	atcat	gg	t t t t t	tgc	ctg	cg	ct	t t t t tgc	gt	tg	tc	cg	t t t t t t t t	at	c		4920
gaa	ag	ag	ggt	gtaca	aaa	aatt	atg	aca	tcg	ctg	gtc	gtt	cct	gg	ctg	gat	acg			4973
							Met	Thr	Ser	Leu	Val	Val	Pro	Gly	Leu	Asp	Thr			
							1				5					10				
ctg	cgt	caa	tgg	ctc	gat	gac	ctg	ggg	atg	agt	t t t	t t t	gaa	tgt	gat					5021
Leu	Arg	Gln	Trp	Leu	Asp	Asp	Leu	Gly	Met	Ser	Phe	Phe	Glu	Cys	Asp					
			15					20					25							
aac	tgt	cag	gct	ctg	cat	ctg	ccc	cat	atg	cag	aat	t t c	gac	gg	gtc					5069
Asn	Cys	Gln	Ala	Leu	His	Leu	Pro	His	Met	Gln	Asn	Phe	Asp	Gly	Val					
			30				35					40								
t t t	gat	gcc	aaa	atc	gat	ctg	atc	gat	aac	acg	atc	ctg	t t t	t c t	gcc					5117
Phe	Asp	Ala	Lys	Ile	Asp	Leu	Ile	Asp	Asn	Thr	Ile	Leu	Phe	Ser	Ala					
			45				50				55									
atg	gcg	gaa	gtc	cga	cct	tca	gcc	gta	ttg	ccg	ctg	gcg	gcg	gat	tta					5165
Met	Ala	Glu	Val	Arg	Pro	Ser	Ala	Val	Leu	Pro	Leu	Ala	Ala	Asp	Leu					
			60			65				70					75					
t c t	gcc	atc	aat	gcc	agt	t c g	ctg	acc	gtg	aaa	gca	t t t	c t t	gat	atg					5213
Ser	Ala	Ile	Asn	Ala	Ser	Ser	Leu	Thr	Val	Lys	Ala	Phe	Leu	Asp	Met					
				80					85					90						
cag	gat	gat	aat	ctg	cca	aag	ctg	gtg	gtt	tgc	cag	t c t	tta	t c c	gtt					5261
Gln	Asp	Asp	Asn	Leu	Pro	Lys	Leu	Val	Val	Cys	Gln	Ser	Leu	Ser	Val					
			95					100					105							
atg	cag	ggc	gta	acc	tat	gag	cag	t t t	gca	tgg	t t c	gtg	cgt	cag	agc					5309
Met	Gln	Gly	Val	Thr	Tyr	Glu	Gln	Phe	Ala	Trp	Phe	Val	Arg	Gln	Ser					
			110				115					120								
gaa	gag	cag	att	t c g	atg	gtc	att	c t t	gaa	gct	aat	gcc	cat	caa	ctg					5357
Glu	Glu	Gln	Ile	Ser	Met	Val	Ile	Leu	Glu	Ala	Asn	Ala	His	Gln	Leu					
			125				130					135								
ctg	tta	ccg	act																	

caaaatggtg gtgagtggta gcgttgaaaa accactgctc ggtatgctgc atcgcgatgg 10737
 cacaccagaa gacctttgtg actgcccgtt ttatcctgcc tcattttgcgc ccgtttttgc 10797
 ggcgctaaaa ccgtttatcg cccgagcggg gttaacgccc tacaacgtgg cgcgtaagcg 10857
 tggcgaaactg aaatacattc tgctgactga aagccagagt gatggaggca tgatgctgcg 10917
 ctttgtactg cgttctgata ccaagctggc gcaactgcgt aaggcgctgc cgtgggttaca 10977
 cgaacaacta ccgcagctga aagttattac cgtcaatatt cagccggtac atatggcgat 11037
 tatggaaggg gagacggaga totacctgac cgaacaacag gcaactggcg agcgttttaa 11097
 tgacgtaccg ctgtggatcc gtccgcaaag tttcttccag actaatccgg cggtcgccag 11157
 ccagttgtac gccaccgcgc gcgactgggt acgacagctg ccggttaaac atatgtggga 11217
 tctgttctgc ggtgtggggg gctttggttt aactgcgcgc acgctgaca tgcagttaac 11277
 cgggatcgaa attgcatcag aggccattgc ctgtgcaaag cagtcagcgc ctgaactggg 11337
 cttaacgcgt ttgcaatttc aggcgctgga ctccactcag tttgccaccg ctcaggggga 11397
 tgtgccggag ctggtgctgg ttaaccgcc gcgccgcggc attggtaaac cgctgtgtga 11457
 ttatctctca acgatggcac cgcgttttat catctactcc agctgtaacg cccaaactat 11517
 ggcgaaagat atccgcgaac tgccctgggt tcgtattgaa cgggtgcagc ttttcgatat 11577
 gttcccgcat accgcgcact atgaagtgc gacgctgctg gtgaagcaat aaaaaagccg 11637
 catgtgcggc ctgagattgc tgacaaagtg cgcgttggtt atgccggatg cggcgtaaac 11697
 gccttatccg gctacaaaa gcgtgcaaat tcaatacatt gcatgggcca tgtaggcct 11756

<210> 55

<211> 158

<212> PRT

<213> Escherichia coli

<400> 55

Met	Thr	Ser	Leu	Val	Val	Pro	Gly	Leu	Asp	Thr	Leu	Arg	Gln	Trp	Leu
1				5				10					15		

Asp	Asp	Leu	Gly	Met	Ser	Phe	Phe	Glu	Cys	Asp	Asn	Cys	Gln	Ala	Leu
		20						25					30		

His	Leu	Pro	His	Met	Gln	Asn	Phe	Asp	Gly	Val	Phe	Asp	Ala	Lys	Ile
		35					40					45			

Asp	Leu	Ile	Asp	Asn	Thr	Ile	Leu	Phe	Ser	Ala	Met	Ala	Glu	Val	Arg
	50					55					60				

Pro	Ser	Ala	Val	Leu	Pro	Leu	Ala	Ala	Asp	Leu	Ser	Ala	Ile	Asn	Ala
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

65	70	75	80
Ser Ser Leu Thr Val Lys Ala Phe Leu Asp Met Gln Asp Asp Asn Leu			
85	90	95	
Pro Lys Leu Val Val Cys Gln Ser Leu Ser Val Met Gln Gly Val Thr			
100	105	110	
Tyr Glu Gln Phe Ala Trp Phe Val Arg Gln Ser Glu Glu Gln Ile Ser			
115	120	125	
Met Val Ile Leu Glu Ala Asn Ala His Gln Leu Leu Leu Pro Thr Asp			
130	135	140	
Asp Glu Gly Gln Asn Asn Val Thr Glu Asn Tyr Phe Leu His			
145	150	155	

<210> 56

<211> 10160

<212> DNA

<213> Escherichia coli

<400> 56

```

ttactcaciaa cttattgaat ctgcatgata ttgcctgccg ggtaaggcgt tacgccgcat 60
ccggcatcaa atgactcaac gttgtccgcg ttctggtttg cgcgattttt gccagtaaaa 120
atgctcgcgc aaaccttcg cgcactcttc cgccacagca cgcaattcat cgctgtccgc 180
ttcatgacgc agctgatgat ccacattctt taccacaca aattcatgtc ctttgtgccc 240
tgccatgagt tgtcctgaaa acagagcaca cgtaataaag acaaccgata acgccttcgt 300
aaacatcctg ccaccttttt cttacctttt gccgctatga tgcgatcgt ttcttgaggt 360
tattattcag ttttgcaaat tagcgcaaag aaattctgga atcttccttc ctgattttgc 420
attgcattct gccgttgccg cgatttagtg ctattttcga gcaaattaca cacggaggta 480
aacactaatg tttactttgt tgatatactc agcggcaggg aggcgatgtg aaacaaagcg 540
agttcagacg ttggctcgaa tctcagggcg tcgatgtagc gaatggcagc aaccatttga 600
aactcaggtt tcatgggagg cgcagtgtca tgccgcgtca cccctgcgat gagattaaag 660
aaccattgcg taaagcaatc ctgaaacaac tcggtttgag ttaatcgcca attaaaaagg 720
ttaatgacat gcgagagaca gtogaaatta tgcgttatcc cgtcactctt acaccgcgcg 780
cggaaggcgg ttatatggtt ttttttggg atatccctga agcgttgacc cagggcgaaa 840
ctgtcgctga agcgatggaa gcggcaaaag atgctttact gaccgcattt gatttttatt 900
ttgaagataa cgagcttata cctttacctt cgccattaaa tagtcacgat cactttattg 960
aagtaccttt gagcgtcgcc totaaggtat tgctgttaaa tgctttttta cagtcagaaa 1020

```

tcactcagca agagttagcc aggogaattg gcaaacctaa acaggagatt actcgcctat 1080
 ttaacttgca tcatgcgaca aaaatogacg ccgtccagct cgcggaag gcgcttgga 1140
 aagagttatc gctggtgatg gtttaattac agttaacgaa aagttgtcat ttttaacaac 1200
 tgatatagac tgccgaatca tctgcacata attacgattc gataatgaaa aaataccagc 1260
 agcttgacga acaattacgc gagcagattg cgctgggtat ctggcaaccc ggcgatcggt 1320
 tgccttcggt gcgtgaccag gtggcgcttt caggcatgag ctttatgact gtcagccatg 1380
 cctatcagtt cctcgaaagt cagggatata ttatcgacg accgcagtcg ggttattacg 1440
 ttgcgccaca ggcaataaaa atgccgaaag cgccagtcac tccagtcact cgagatgaag 1500
 cagtcgatat caacacttat atttttgata tggtgcaggc cagtcgcat ccgtcggtcg 1560
 ttccgtttgc ctggccttt cccgaccgc gacttttccc cctccaacaa ctaaaccgct 1620
 cgctggcgca ggtaagcaaa accgccacag cgatgagcgt gattgaaaac ttaccgccag 1680
 gaaacgcaga actgcgtcag gctattgtc gtcgctatgc cttacagggc atcaccattt 1740
 ctctgatga aattgtcatt actgccggg cgtagaggc attaaacctc agtttgcaag 1800
 cggtaactga accgggcgat tgggtgatag tagagaatcc ttgtttctac ggtgcgttgc 1860
 aggcgctgga gcggctacg ctgaaggcgt tatcggtggc gacggatgtt aaagaaggga 1920
 tagatcttca ggcgctgga ctggcggtgc aggagtatcc ggtgaaagcg tgctggctga 1980
 tgactaatag ccagaatcca ctcgattta ccttaacgcc gcaaaaaaaaa gcacaactgg 2040
 tggcggtgct caatcagtac aacgtaacgc tgattgaaga tgacgtttac agcgaacttt 2100
 attttgacg ggaaaaaccg ctgcctgcga aagcgtggga tcgccacgat ggcgttttgc 2160
 attgctcttc gttttcgaaa tgtctggtgc ctggttttcg tattggttgg gtcgccgcg 2220
 gaaaacatgc acgtaaaatt caacgcttgc agttgatgag tacgctttcc accagctcac 2280
 cgatgcaact tgcgctggtg gattaccttt ccacgcgcg atacgacgcc catcttcgtc 2340
 gcctgcgtcg ccagcttgcg gaacgtaaac aacgtgcctg gcaggcactg ctgcgttata 2400
 tgctgcgga agtgaaaatt catcataatg acagtggta ctttctctgg ttggagctcc 2460
 ccgagccgtt agatgccggc gaattaagcc tggcggcact gacgcatcat atcagtattg 2520
 cgccgggtaa aatgttttct accggtgaaa actggtcacg ttttttccgt ttttaataccg 2580
 cgtggcagtg gggagagcgt gaagaacagg cggtaaaaca attaggcaaa cttattcaag 2640
 aacggctgta atagcgttta atttaattcc tcttagattg ggtaatatga atttcgaata 2700


```

aatcaaaaaa gcaaggggtga gcgactgatt catccaatcg cgtcgggttc agtgcgctcg 9600
tcgagttgca actgcataaa tgtcagatcc agccaacgac caaatattagt gcctacctgc 9660
ggcattttgcg cggtgacgac aaatcccagc gactggtgga gatgcagcga ggccctgattt 9720
tgcgattcga tcccggcgac catgacatgc ttcccgcaat cccgcgcttc atcaatcaat 9780
cggcttaaca atttacgccc cagacctttg cctgatgat cgggatggac ataaaccgaa 9840
tggtccacgg tatggcgaaa accatcgaaa ctacgccagt cgccaaacga ggcatatccc 9900
gtcactacgc cgttttcctc gtcaccagc actggataac ctgctaaagt ccgcgcttca 9960
aaccaggcaa tgcggttatc agcatccacc gtttggtcat tccagatagc cgcggtatac 10020
aacacggcgt ggttataaat ttccgcaatg gcagcacagt cggctttgcg ggcaaaacgg 10080
atggacatgt ctggcctcaa taaaataatg atgatgatgt tatcaatact atcgaaaaca 10140
gcccgaagca acggattcct 10160

```

```

<210> 57
<211> 172
<212> PRT
<213> Escherichia coli

```

```

<220>
<223> complement of position 9570-10088 of seq id 56

```

```

<400> 57
Met Ser Ile Arg Phe Ala Arg Lys Ala Asp Cys Ala Ala Ile Ala Glu
 1             5             10             15

Ile Tyr Asn His Ala Val Leu Tyr Thr Ala Ala Ile Trp Asn Asp Gln
                20             25             30

Thr Val Asp Ala Asp Asn Arg Ile Ala Trp Phe Glu Ala Arg Thr Leu
          35             40             45

Ala Gly Tyr Pro Val Leu Val Ser Glu Glu Asn Gly Val Val Thr Gly
          50             55             60

Tyr Ala Ser Phe Gly Asp Trp Arg Ser Phe Asp Gly Phe Arg His Thr
          65             70             75             80

Val Glu His Ser Val Tyr Val His Pro Asp His Gln Gly Lys Gly Leu
          85             90             95

Gly Arg Lys Leu Leu Ser Arg Leu Ile Asp Glu Ala Arg Asp Cys Gly
          100            105            110

Lys His Val Met Val Ala Gly Ile Glu Ser Gln Asn Gln Ala Ser Leu
          115            120            125

His Leu His Gln Ser Leu Gly Phe Val Val Thr Ala Gln Met Pro Gln

```

130	135	140
Val Gly Thr Lys Phe Gly Arg Trp Leu Asp Leu Thr Phe Met Gln Leu		
145	150	155
Gln Leu Asp Glu Arg Thr Glu Pro Asp Ala Ile Gly		
	165	170

<210> 58
 <211> 10614
 <212> DNA
 <213> Escherichia coli

<400> 58
 ccggttcgcg gcctttccag caggttgtat taccgtagta atgcaagcgc gtctcagcgg 60
 agacaatact cgccagtaac tctctttttg tcaagcaaaa gagagttatt attgttctgt 120
 tagtgtatta tccactgcgg ccctttccgc cgtctcgcaa acgggcgctg gctttaggaa 180
 aggatgttcc gtggccgtaa atgcaggtgt ttcacagcgc ttgctatcgc ggcaatatcg 240
 ccagtgggtgc tgtcgtgatg cggctcttcgc atggaccgca caatgaagat acggtgcttt 300
 tgtatcgtac ttattgtttc tgggtgcgctg ttaaccgagg taaataataa ccggagtctc 360
 tccggcgaca atttactggt ggttaacaac cttcagagca gcaagtaagc ccgaatgccg 420
 ccctttgggc ggcataatatt agattatccg attctgttta aagtcacgca aaaaaccacc 480
 ccagcgacgt tcatagaatg ggcgaatatg ttcggtaata aagtggctaa ttcctttttc 540
 cccttttttc acctgacaaa tatcgattgg ttcacgcca ggtaatgtat cggtcgctac 600
 acttcccgtc gcctgaataa tttcttcgat atcaccatcg gcttcaatgc caataagtaa 660
 attaggctgt gcctcttcgt tctctttaat tgaacaaata aaagcacgct tcaccggctt 720
 aatgggtttta aataagggtg tgagtgaatc aatcatttgt gctggcgggt ctgcgacttc 780
 cgataaatatc agcgattcac cgccttcag gatttcttg ctgctcagcg gatttccctc 840
 ttcaccaatc aacaaactga tttcacgcgg cataaattct ttaccggttg gcagtttggc 900
 attaaggaag agcgtttcgc caagtgtcat ctcaaacagc gtgcgaacgg gcattacgac 960
 aaatgcctgt tcgtottcaa ccgcctgttg aagtgttct aacgaggtga aaaaaggaat 1020
 gacgctggtg ccgtcttctt tttcccagtg ctgtaaatca agcgcgctat cttcaaccac 1080
 agcctcgccc tgcgcgcgcg taccaggcac ccagacggtg gattccagta gactacggaa 1140
 aaaggccggg cggtgccgcg gttcagttgc tgctttttcc agcaggtctt caagttcgtt 1200
 ttttgtttcg gacataagaa ccacaattca ttcaacgttc ggggcgcaaa tgctgatgc 1260

gctacgctta tcaggcctac aagggattcg caatttggtg aatttgcaga atttgtaggc 1320
 cggataaggc gtttacgccg catccggcat attagtttac gccgttaaca gattagctat 1380
 cgtgcgcaca ccaagtcccg tagcgcccg agaccactgt tcaaccggcg ctttacggta 1440
 agtcgccgag cagtcgatat gcagccagcc ttgctgatag ttctcaacaa agtgcgacag 1500
 gaagcccgcg gccgtgctcg cgctgcgag atacgcgag cttccggtat tgttcagttc 1560
 ggcaaagtta gacggcagct ggctgcggtg gaactccgcc agcggcagac gccagaacgg 1620
 ttcgttctcc tgcgcggcac tcgccagcaa gcgaccggcc agcgcacgtg caaaactgaa 1680
 cagcgcgtga taatcattac ccagcgcagt ttctgcgccc ccggtgaggg tcgccgcatc 1740
 aatgatcatt tccggtttct gcgcactggc atcaatcaga ccatcggcaa gcaccagacg 1800
 cccttcggca tcagtgttca tcaattcaac tttttaccg ttgcgatagg tgatgatata 1860
 gccagcttg aacgcattgc cgctaatacag gttatccgca cagcagagga acagcttcac 1920
 gcgcttggtc agtcgcgag taatggcaaa tgccagcgcc ccggtaacgg ttgccgcgcc 1980
 gccatgtcc gacttcacg agtcataaa cgcagtcgtg ttgatgctgt agccgccgga 2040
 gtcaaaagtg atacctttac ctaccaggca cgcgtacact ggcgcttctt tatcgccagt 2100
 tgggttgtaa tccagcgcca gcaataccgg agaacgttct gaaccgcgtc cgactgtgtg 2160
 cagccccata taaccttgct cagcagatc ttgcctttg gtgatccgat aagtcacacg 2220
 atcgcccgcg acgttgctga tcagatcaac agcacgctgt gccagttgag atggtcccaa 2280
 ttcttctgcc ggtgcgttga tgggtgtcag caccagtcg atgatcatca ggcggttatc 2340
 cagttcctgg cgctgggcat cgtccagatc cggccacacc actttacggg tgcctttcgg 2400
 ggctttgtaa ccttgccaga atgccagca gcgatccgca tccagcctt caccgcttaa 2460
 ctgaacatgc ttgatgcca gaccgtcaat cttgcgcgcc gcacgctgga tcagccccag 2520
 atcgtctgcc ccgttcaa at gcagggtaat gccgtcatta ttaatgctgt aagttgcttt 2580
 ttctccccag cgcgcgtcgg caggttggtg agagagggt atcttcacg cttctgtcat 2640
 tttagttatc cttctttgta aaagggccgc cagttggcag cccagagatt tttccgctaa 2700
 atgattcgcg tgcaggaag gcggcaagtg agtgaagccc caggagcata gataactatg 2760
 tgactggggt gaacgagcgc agccaacgca tctgcggcgt gaagcatgac gcggaaatta 2820
 ttcggcctcg tccagccaga ctaacaaaat cgcttcgagg attttctcgt tggatgcctg 2880
 cgggtcgctg tcgaaatctt ccagatcgca aatccactga tgcatatcgg tgaatcgaac 2940
 cgttttcgga tcaagatcgg gatacgcate gtacagtgtc tcgccaattt cgcggctatc 3000

11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

gtgaccaacg tagataaagc tgccgaagcg gtgattatcg acacgattcg taaatcttac 9900
 ccacagcaca ccatcatcac cgaagaaagc ggtgaacttg aaggtactga tcaggatggt 9960
 caatgggtta tcgatccact ggatggcact accaacttta tcaaactgtc gccgcacttc 10020
 gcggtatcta tcgctgttcg tatcaaagcg cgcaaccgaag ttgctgtggt atacgatcct 10080
 atgcgtaacg aactgttcac cgccactcgc ggtcagggcg cacagctgaa cggtaccga 10140
 ctgcgcggca gcaccgctcg cgatctcgac ggtactattc tggcgaccgg cttcccgttc 10200
 aaagcaaaac agtacgccac tacctacatc aacatcgtcg gcaaactggt caacgaatgt 10260
 gcagacttcc gtcgtaccgg ttctgcggcg ctggatctgg cttacgtcgc tgcgggtcgt 10320
 gttgacggtt tctttgaaat cggctcgcgc ccgtgggact tcgccgcagg cgagctgctg 10380
 gttcgtgaag cgggcggcat cgtcagcgac ttcaccggtg gtcataacta catgctgacc 10440
 ggtaacatcg ttgctggtaa cccgcgcgtt gttaaagcca tgctggcgaa catgcgtgac 10500
 gagttaagcg acgctctgaa gcgttaatga ctcaggcggg tgatatcact caccgcacct 10560
 cgcctttcag gcgctattcc gaaatacttc ctcactgctt tactttcttt cgtc 10614

<210> 59

<211> 412

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 6599-7837 of seq id 58

<400> 59

Met Met Tyr Gly Val Tyr Arg Ala Met Lys Leu Pro Ile Tyr Leu Asp
 1 5 10 15

Tyr Ser Ala Thr Thr Pro Val Asp Pro Arg Val Ala Glu Lys Met Met
 20 25 30

Gln Phe Met Thr Met Asp Gly Thr Phe Gly Asn Pro Ala Ser Arg Ser
 35 40 45

His Arg Phe Gly Trp Gln Ala Glu Glu Ala Val Asp Ile Ala Arg Asn
 50 55 60

Gln Ile Ala Asp Leu Val Gly Ala Asp Pro Arg Glu Ile Val Phe Thr
 65 70 75 80

Ser Gly Ala Thr Glu Ser Asp Asn Leu Ala Ile Lys Gly Ala Ala Asn
 85 90 95

Phe Tyr Gln Lys Lys Gly Lys His Ile Ile Thr Ser Lys Thr Glu His
 100 105 110

Lys Ala Val Leu Asp Thr Cys Arg Gln Leu Glu Arg Glu Gly Phe Glu
 115 120 125
 Val Thr Tyr Leu Ala Pro Gln Arg Asn Gly Ile Ile Asp Leu Lys Glu
 130 135 140
 Leu Glu Ala Ala Met Arg Asp Asp Thr Ile Leu Val Ser Ile Met His
 145 150 155 160
 Val Asn Asn Glu Ile Gly Val Val Gln Asp Ile Ala Ala Ile Gly Glu
 165 170 175
 Met Cys Arg Ala Arg Gly Ile Ile Tyr His Val Asp Ala Thr Gln Ser
 180 185 190
 Val Gly Lys Leu Pro Ile Asp Leu Ser Gln Leu Lys Val Asp Leu Met
 195 200 205
 Ser Phe Ser Gly His Lys Ile Tyr Gly Pro Lys Gly Ile Gly Ala Leu
 210 215 220
 Tyr Val Arg Arg Lys Pro Arg Val Arg Ile Glu Ala Gln Met His Gly
 225 230 235 240
 Gly Gly His Glu Arg Gly Met Arg Ser Gly Thr Leu Pro Val His Gln
 245 250 255
 Ile Val Gly Met Gly Glu Ala Tyr Arg Ile Ala Lys Glu Glu Met Ala
 260 265 270
 Thr Glu Met Glu Arg Leu Arg Gly Leu Arg Asn Arg Leu Trp Asn Gly
 275 280 285
 Ile Lys Asp Ile Glu Glu Val Tyr Leu Asn Gly Asp Leu Glu His Gly
 290 295 300
 Ala Pro Asn Ile Leu Asn Val Ser Phe Asn Tyr Val Glu Gly Glu Ser
 305 310 315 320
 Leu Ile Met Ala Leu Lys Asp Leu Ala Val Ser Ser Gly Ser Ala Cys
 325 330 335
 Thr Ser Ala Ser Leu Glu Pro Ser Tyr Val Leu Arg Ala Leu Gly Leu
 340 345 350
 Asn Asp Glu Leu Ala His Ser Ser Ile Arg Phe Ser Leu Gly Arg Phe
 355 360 365
 Thr Thr Glu Glu Glu Ile Asp Tyr Thr Ile Glu Leu Val Arg Lys Ser
 370 375 380
 Ile Gly Arg Leu Arg Asp Leu Ser Pro Leu Trp Glu Met Tyr Lys Gln
 385 390 395 400
 Gly Val Asp Leu Asn Ser Ile Glu Trp Ala His His
 405 410

<210> 60
 <211> 12144
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (8854)..(9402)

<400> 60
 ctgtttctct gtttgaacga tgactaaata gtgactgcga aaatgagata agccgttctc 60
 aaggcgctcct ggcgccccaaa ttcgtgggaa tttattttac taattcagat gatcaaat 120
 actttaaaag gagtgaaggg atgtctgata taaaccatgc aggttctgac cttatatattg 180
 aactggagga tcgccctccc tttcatcagg ctctcggttg tgccattacc catctgttgg 240
 caattttcgt tccgatggta acccccgctg taatcgtagg tgcggcctta cagctttccg 300
 ctgaaacaac tgcctatctt gtttctatgg cgatgatgc ctctggtatt ggtacctgg 360
 tacaagtaaa ccgctacggc atcgctcggt ctggcctact ctcaattcag tcagtcaatt 420
 tttcatttgt tacggctcatg attgcgctgg gcagcagcat gaaaagcgac ggttttcacg 480
 aagagttaat catgctgctg cttctcgggc tctccttcgt tggcgcat 540
 gatcttcatt tatcttgccc tatttacgtc ggttattac gcctaccgtc agcggattg 600
 tgggtactgat gatcggtta agcctgatta aagtcggcat tatcgatttt ggtggaggat 660
 ttgcagccaa aagcagcggc acgttcggca attacgaaca tctcggcggt ggtttattgg 720
 ttttaattgt ggtgatcggc ttttaactgt gtgcagtc gttgctacgc atgggaggga 780
 tcgccattgg gctatgtgtc ggctatatcg catcgttatg cctgggcatg gtggatttca 840
 gcagtatgcg caatttgccg ttaatcacca tcccgcaccc gttcaaatac ggctttagtt 900
 ttagcttcca tcagttcctg gtggttggca cgatttatct gcttagcgtg ctggaagcag 960
 tcggcgatat caccgccacg gcaatggttt cccgccgcc cattcagggg gaagagtatc 1020
 agtcccggct gaaaggcggc gtgctggcag atggtctggt ttctgttatc gcctccgctg 1080
 tcggttcatt accattaacc acgtttgcgc aaaataatgg ggttattcag atgactggcg 1140
 tcgcttcacg ttatgtcggc cgaaccatcg cggtaatgct ggttatcctc ggcttatttc 1200
 cgatgattgg cggcttcttc acgaccattc cctcggcagt tctgggaggc gcaatgacgt 1260
 tgatgttttc catgattgcc atcgcaggga ttcgcatcat catcaccaac ggtttaaagc 1320
 gccgtgaaac acttattgtc gccacttctt taggtttagg gcttggcgct tcctacgac 1380

cogaaatttt taaaatattg ccagcctcta tttatgtatt agttgaaaac cctatttgtg 1440
 ctggcgggtt aactgcgatt ttattaaata ttatcctccc tgggtggctac cgacaggaaa 1500
 acgttctgcc tggattacc tcagcgggaag agatggatta acagtaaagg agtcaatgat 1560
 gtcaggagaa cacacgttaa aagcggtagc aggcagtttt attgatgtca cccgtacgat 1620
 cgataacccg gaagagattg cctctgcgct gcggtttatt gaggatgggt tattactcat 1680
 taaacaggga aaagtgaat ggtttggcga atgggaaaac ggaaagcatc aaattcctga 1740
 caccattcgc gtgcgcgact atcgcggcaa actgatagta cggggctttg tcgatacaca 1800
 tatccattat ccgcaaagtg aaatgggtggg ggcctatggg gagcaattgc tggagtgggt 1860
 gaataaacac acctcccta ctgaacgtcg ttatgaggat ttagagtacg cccgcgaaat 1920
 gtcggcggtt tcatcaagc agcttttacg taacggaacc accacggcgc tgggtgttg 1980
 cactgttcat ccgcaatctg ttgatgcgct gtttgaagcc gccagtcata tcaatatgog 2040
 tatgattgcc ggtaagggtga tgatggaccg caacgcaccg gattatctgc tcgacactgc 2100
 cgaaagcagc tatcaccaaa gcaaagaact gatcgaacgc tggcacaaaa atggctgtct 2160
 gctatatgcg attacgccac gcttcgcccc gacctcatct cctgaacaga tggcgatggc 2220
 gcaacgcctg aaagaagaat atccggatac gtgggtacat acccatctct gtgaaaacaa 2280
 agatgaaatt gcctgggtga aatcgcttta tcctgaccat gatggttatc tggatgttta 2340
 ccatcagtag ggctgaccg gtaaaaactg tgtctttgct cactgcgtcc atctogaaga 2400
 aaaagagtgg gatcgtctca gcgaaaccaa atccagcatt gctttctgtc cgacctcaa 2460
 cctttacctc ggcagcggtt tattcaactt gaaaaaagca tggcagaaga aagttaaagt 2520
 gggcatggga acggatatcg gtgccggaac cactttcaac atgctgcaaa cgctgaacga 2580
 agcctacaaa gtattgcaat tacaaggcta tcgcctctcg gcatatgaag cgttttacct 2640
 ggccacgctc ggcgagcga aatctctggg ccttgacgat ttgattggca actttttacc 2700
 tggcaaagag gctgatttcg tggatgatga acccaccgcc actccgtac agcagctgog 2760
 ctatgacaac tctgtttctt tagtcgacaa attgttcgtg atgatgacgt tgggcgatga 2820
 ccgttcgatc taccgcacct acgttgatgg tcgtctgggt tacgaacgca actaataata 2880
 aaactttaac atcctcgtga ggacatcatt atgtctggag acatcctaca aacaccggac 2940
 gcaccaaagc cacagggcgc gctggataat tatttttaaa ttaccgctcg tggcagtacc 3000
 gttcgtcagg aagtactggc tggcttaacg acctttctgg ccatggttta ttccgttacc 3060

gtcgttccgg gaatgctggg caaagcaggt tttcctcccg cagctgtgtt tggtgccacc 3120
 tgtctggctg cgggcttcgg ctggttgctg atgggattat gggctaattt gccaatggcg 3180
 attggttgcg cgatttcctt gacggcggtt accgcattca gtctggtact cgggcaacaa 3240
 attagcgttc ctgtcgcaact gggcgcggtta tttctgatgg gcgtcatctt caccgccatt 3300
 tccgtaaccg gtgtgcgtac ctggatctta cgtaatttgc cgatgggtat cgctcacggg 3360
 acaggatatg gtatcgggct gtttctgctg ctgattgctg ctaacgggtg gggatatggt 3420
 atcaaaaacc cgattgaagg cttgcagtg gctcgggtgc gtttacctcc ttcccggtga 3480
 tgatgagctt gctggggctg gcggctcatc tgggcctgga gaagtgtcgc gtaccggcg 3540
 ggatcttggt ggtgattatt gcaatttcga tcatcggtt aatctttgac ccagcggtga 3600
 aataccacgg tctggtggcg atgccaaagg tgactggcga agatggtaag tctctgattt 3660
 tcagcctcga tattatgggt gcactccagc caactgtact tccgagtga ctggcattgg 3720
 tgatgaccgc agtggttcgac gctactggca ccatccgtgc cgtcgccggg caggcgaatt 3780
 tggttgataa agacaaccag atcatcaacg gcggcaaagg cctgaccagt gactcagtaa 3840
 gttcaatatt ctccggcctg gtggggcgag cggccgcagc ggtttatata gaatcagcg 3900
 caggaaccgc cgccgggggt aaaacaggtt taaccgcaac cgtagtgagg gcgttattcc 3960
 tgtaattct gtttttatca ccgtgtcat tttgatccc tggttacgcc actgcacccg 4020
 ctctgatgta cgtaggtttg ctgatgttaa gtaacgtctc gaagctggat ttcaatgatt 4080
 ttattgacgc tatggctggc ctggtgtgtg ccgtgtcat cgttctgact tgtaatatcg 4140
 ttaccggtat tatgctgggc tttgtgacac tggctgtagg ccgctcttt gcacgcgaat 4200
 ggcaaaagct gaatattggt acggtgatca ttactgccgc actggtcgca ttttacggcg 4260
 gtggttgggc aatctaatag attctccgcg ccttcagcg cggagatttc tttcagagag 4320
 gattctcacc gctggcaaca atacgtgct ggcggaactc cctgagttct ctttcagtaa 4380
 gcaactgcag cgctgtgtt gggcaagatt caacgcagc tggcccctct tcccgctgtt 4440
 cacagagatc gcatcctaca atttgtgtc gggatcccc cggcaacgac tgaatggtga 4500
 tcattccaaa cgggcacgca ctgacgcaac tctgacagcc aatacaacg gcagaattgg 4560
 tctgcaccac ctgctcgccc atcgtcagcg ccccccagg gcaagcgcca acacaagggg 4620
 cgttttcaca ctgatggcac atcaccggcg cactgatgct gtccagtcgc tgtacctca 4680
 gccggggtaa aaagacatcg gcattcaact cctgttctga agggtgagcg accacacagg 4740
 ctacttcaca agtacggcg ccaatacagt cagccggatt aacgataatt aacgatttca 4800

227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

tacgctatcg gactggaaag tcagagcatt aaccggacaa gccgtaacgc aaggggcatt 6540
 gttgcagtga tggcaggcca ccggaattcg agcctggcct ttccctacaa cgtggatacg 6600
 cggtcgaaag tcaactgtgac tcagcggcca gttttcttga ttgtgtgcca ccgcacaggc 6660
 aatttcacaa gcatgacagc ctatacatc cgcagcttca gcagcaataa acttattcat 6720
 ttgcatccct ttcatTTaat gagttatgtc ttctcaaatt tcgcgatgca ataaacgggc 6780
 atatattagg tagcatgacc gttttaatta taattttgcy actgagttca aattattgcc 6840
 cctcaatcta tgcgcgtttc attatttcaa cattgccgat caaaagagcg ctatccagat 6900
 aaaaacgatt aaatgcgaga gtgcgacatg ccagaatgat taatgaaata tcaatatgag 6960
 aaaattacag ataattccat tgtcaggttc tcttctcatt ttctgtggtt aaccacgatt 7020
 atgtgattgc ctccgcaatt cctgtctcta actcccttc ctgcacaaaa ctggcactcc 7080
 acgagcatgt gtttagacag ttctattaac gtaaacgggt gctttttact ctggcgggcy 7140
 aaaggagaaa cactgatgag cgccatagat tcccaacttc cctcatcttc tgggcaagac 7200
 cgcccaactg atgaggttga ccgcatatta tcaccaggaa agctgatcat actcgggtctg 7260
 caacacgtcc ttgtcatgta cgcagggtgca gtgcgtgttc ctcttatgat tggtgaccga 7320
 ctgggcctct caaaagaagc tattgcgatg ctcattagct cggatctctt ttgtgcggg 7380
 atcgtcacat tattgcaatg tatcggatc ggccgcttta tggggatccg cctgccggtg 7440
 attatgtcgg tgacctttgc tgctgtaaca ccaatgatag ccattgggat gaaccggat 7500
 atcggcctgc tggggatatt tggtgccact atcgcgcgg gttttatcac cacattatta 7560
 gcgccactta tcggtcgctt gatgccttta ttcccgccac tggttaccgg tgtggttatt 7620
 acttctatcg ggcttagcat cattcagggtg ggtattgact gggccgcgg aggtaaagg 7680
 aatccgcaat atggtaatcc cgtttattta ggtatctcct ttgccgtctt aatttttatc 7740
 ttgtcatta ctgcctatgc gaaaggattt atgtccaacg tcgccgtatt actggggatt 7800
 gtatttggt ttttactttc gtggatgatg aatgaagtca atttatccg gctacatgat 7860
 gcttcatggt ttgcgattgt tacgccgatg tcgtttggta tgccgatttt cgatcccggt 7920
 tccattctga ccatgactgc cgtgttaatc atcgtgttta tcgagtcaat ggggatgttc 7980
 ctggcactgg gtgaaatagt cggtcgtaaa ctctcttcgc acgatattat tcgcgggctg 8040
 cgtgtcgatg gcgtaggac aatgataggc ggcacgttta acagcttccc ccacacgtca 8100
 tttctcaaa acgttggcct ggtagcgtg acgcgcgttc atagccgctg ggtgtgtatt 8160
 tcttcgggaa ttatattaat cctgtttggc atggtgccaa aaatggcgggt gctggtagcc 8220

tccattccgc	aatttgct	ggcgcgct	ggtctagtga	tgctcgcat	ggtactggcg	8280										
acagggatc	gaattctgtc	gcgctgtaac	tacaccacca	accgttacaa	cctctatatt	8340										
gtggcgatca	gtctcggcgt	tggcatgact	ccgacgctct	ctcacgattt	cttttctaag	8400										
ttaccggccg	tactgcaacc	gctgctacat	agcggcatta	tgctcgcaac	ccttagcgcc	8460										
gttggtgctga	acgtcttctt	taatggctat	cagcatcatg	ctgacctggt	gaaggaatcc	8520										
gtctctgata	aagatttaaa	agtcaggaca	gtacgtatgt	ggcttctgat	gcgcaagctg	8580										
aagaaaaatg	agcatggaga	ataatatgaa	ttttttaatg	cgcgctatat	tcagtctgtt	8640										
gttgcttttt	actctctcta	ttcctgtcat	ttctgactgt	gttgcaatgg	ccattgaaag	8700										
tcgcttcaaa	tatatgatgc	tactttttta	aatggttttt	acctgtcggc	atccgctcaa	8760										
aacgggcggt	tgctgataaa	cgctcacttg	gttaatcatt	tcactcttca	attatctata	8820										
atgatgagtg	atcagaatta	catgtgagaa	att	atg	caa	acg	gaa	cac	gtc	att	8874					
				Met	Gln	Thr	Glu	His	Val	Ile						
				1						5						
tta	ttg	aat	gca	cag	gga	gtt	ccc	acg	ggt	acg	ctg	gaa	aag	tat	gcc	8922
Leu	Leu		Ala	Gln	Gly	Val	Pro	Thr	Gly	Thr	Leu	Glu	Lys	Tyr	Ala	
		10					15					20				
gca	cac	acg	gca	gac	acc	cgc	tta	cat	ctc	gcg	ttc	tcc	agt	tgg	ctg	8970
Ala	His	Thr	Ala	Asp	Thr	Arg	Leu	His	Leu	Ala	Phe	Ser	Ser	Trp	Leu	
		25				30					35					
ttt	aat	gcc	aaa	gga	caa	tta	tta	gtt	acc	cgc	cgc	gca	ctg	agc	aaa	9018
Phe	Asn	Ala	Lys	Gly	Gln	Leu	Leu	Val	Thr	Arg	Arg	Ala	Leu	Ser	Lys	
		40			45					50					55	
aaa	gca	tgg	cct	ggc	gtg	tgg	act	aac	tcg	gtt	tgt	ggg	cac	cca	caa	9066
Lys	Ala	Trp	Pro	Gly	Val	Trp	Thr	Asn	Ser	Val	Cys	Gly	His	Pro	Gln	
				60					65					70		
ctg	gga	gaa	agc	aac	gaa	gac	gca	gtg	atc	cgc	cgt	tgc	cgt	tat	gag	9114
Leu	Gly	Glu	Ser	Asn	Glu	Asp	Ala	Val	Ile	Arg	Arg	Cys	Arg	Tyr	Glu	
			75					80					85			
ctt	ggc	gtg	gaa	att	acg	cct	cct	gaa	tct	atc	tat	cct	gac	ttt	cgc	9162
Leu	Gly	Val	Glu	Ile	Thr	Pro	Pro	Glu	Ser	Ile	Tyr	Pro	Asp	Phe	Arg	
		90					95					100				
tac	cgc	gcc	acc	gat	ccg	agt	ggc	att	gtg	gaa	aat	gaa	gtg	tgt	ccg	9210
Tyr	Arg	Ala	Thr	Asp	Pro	Ser	Gly	Ile	Val	Glu	Asn	Glu	Val	Cys	Pro	
		105				110					115					
gta	ttt	gcc	gca	cgc	acc	act	agt	gcg	tta	cag	atc	aat	gat	gat	gaa	9258
Val	Phe	Ala	Ala	Arg	Thr	Thr	Ser	Ala	Leu	Gln	Ile	Asn	Asp	Asp	Glu	
120					125					130					135	

• $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ (表 1)

gttcttcggtt ctctttgccc tcgaattctg cgtgcaattg gtcagaggta tgatcgcgac 10842
 ggaaatcggtt cgggaaggca atcccttgcg cgcgcagggtt cgcagcttc tcacgacgag 10902
 ttttcagttc attgttaaga tcgactaccg cgtcagcgcc ctgtgcgtgt tgttcagaca 10962
 tgttggttcc tcataaccct gctttcaaac ttgcttcgat aaattgatcc aggtgcggt 11022
 ccagcacggc ctgcgtggtg cgggtttcta ccccggtgcg cagatcttta atgcgggagt 11082
 catcaaggac ataagaacga atctggctgc cccagccgat gtcggatttg ttatcttcca 11142
 tcgcctgttt ctcggcattt ttcttctgca tctccagttc ataaagcttc gctttcatct 11202
 gcttcatggc ctgatctttg ttcttctgct gggaacggtc gttctggcac tgggtcacga 11262
 tcccggtcgg gatgtgggta atacgcaccg cagattcggg acggttaacg tgctgaccgc 11322
 ccgcgccgga cgtgcgataa acgtcaatgc gcagatccgc cgggttgatt tcgatatcaa 11382
 tatcatcatc aacttcgga taaacaaacg cggagctgaa cgacgtgtgg cgacgaccgc 11442
 cggagtcaaa cgggctttta cgcaccaggc ggtgaacgcc ggtttctgta cgcagccagc 11502
 cgtaagcgta atgcgcggag attttgatcg tcacggattt aataccgcc acttcacctt 11562
 ccgactcttc gatgatttca gttttgaaac cagcgcattc tgcccagcgc agatacatc 11622
 gctcaagcat gctcgcccag tctgtgctt ccgtaccgcc agacccgcc tgaatatcga 11682
 ggtagcagtc ggcgtgtca tattcgccag agaacatacg gcggaactca agctgcgcca 11742
 gtttttcttc cagggcgctg agttcagcaa cggcttcggt aaaggtttct tcgtcgtcag 11802
 ctctacagc cagttccagc agaccagaaa catcttccag cccctgtttc atttggtcga 11862
 ggggtgtcagc aacggcttcg agggaggaac gctctttacc cagcgcctgt gcgcgttcgg 11922
 gttcgttcca gacatccggc tgttccagct cggcggttac ttcttccaga cgctctttct 11982
 tggcgtcgta gtcaaagata cccctaaga acgtcggagc gttccgtgag gtcctgaatg 12042
 cgattattta ccggattaat ttcaaactg gtctgatttc ttttattgag ctagtcaaaa 12102
 tgcggtgata agagcgggat tgtaccaat ccacgtctt tt 12144

<210> 61

<211> 182

<212> PRT

<213> Escherichia coli

<400> 61

Met Gln Thr Glu His Val Ile Leu Leu Asn Ala Gln Gly Val Pro Thr

1

5

10

15

Gly Thr Leu Glu Lys Tyr Ala Ala His Thr Ala Asp Thr Arg Leu His
 20 25 30
 Leu Ala Phe Ser Ser Trp Leu Phe Asn Ala Lys Gly Gln Leu Leu Val
 35 40 45
 Thr Arg Arg Ala Leu Ser Lys Lys Ala Trp Pro Gly Val Trp Thr Asn
 50 55 60
 Ser Val Cys Gly His Pro Gln Leu Gly Glu Ser Asn Glu Asp Ala Val
 65 70 75 80
 Ile Arg Arg Cys Arg Tyr Glu Leu Gly Val Glu Ile Thr Pro Pro Glu
 85 90 95
 Ser Ile Tyr Pro Asp Phe Arg Tyr Arg Ala Thr Asp Pro Ser Gly Ile
 100 105 110
 Val Glu Asn Glu Val Cys Pro Val Phe Ala Ala Arg Thr Thr Ser Ala
 115 120 125
 Leu Gln Ile Asn Asp Asp Glu Val Met Asp Tyr Gln Trp Cys Asp Leu
 130 135 140
 Ala Asp Val Leu His Gly Ile Asp Ala Thr Pro Trp Ala Phe Ser Pro
 145 150 155 160
 Trp Met Val Met Gln Ala Thr Asn Arg Glu Ala Arg Lys Arg Leu Ser
 165 170 175
 Ala Phe Thr Gln Leu Lys
 180

<210> 62
 <211> 12354
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (11183)..(11818)

<400> 62
 gacagcgcgt ttggtggctac gccggaaaat ttgccaacaa tttaccgcaa gccgcgcgtc 60
 atgtacatgg aacatccttt tgccgcttca gaaatctctg gatcatgctc gcatgttgcg 120
 caatctactc gcccgctccgc tgcgcttttc cttatactga gactgagcgt cgattcacct 180
 gcaaacggcg catttttaga ataatcctga ccttgtgctg aagagaaaac atgaaaattc 240
 ggcgccttatt ggtagcaatg agcgtggcaa cgggtactgac tggttgccag aatatggact 300
 ccaacggact gctctcatca ggagcggaag cttttcaggc ttacagtttg agtgatgcgc 360
 aggtgaaaac cctgagcgat caggcatgtc aggagatgga cagcaaggcg acgattgcgc 420

acctaaggtg ctcatggatg gactcctatt acaaagtoga tataaaaaaa cccttcgcg 2160
 tcgttaggcc cgacgaggaa gggttggatt tgtcacaata aattgtggcg gattatcacc 2220
 gctaaattaa gcggattcaa gtaacacagg acttactcat cttcaagata agtataaccg 2280
 taaaaacctg cctogaactc ttcaaggaaac tgttggtgca gttcagcatc aagatcgggt 2340
 ttcttcactt gatcgcgga ctgggttaac agcgttttcg gatcgagctg tacatattgc 2400
 agcatgtccg ccacggtatc gccttcgtca gacagttcta cttctacgct accgtcaggg 2460
 aagacgaaca cgtcaaccgc ttcggtatca ccgaacagg tgtgcatgtt gccgaggatc 2520
 tcctgatatg cgccgaccat aaagaaaccg agcatcggcg gattctctgg atcgtactcc 2580
 ggcatggca ttgtcgtggc aataccgtca ccatcaatat agtggtcgat agcacctca 2640
 gagtcacagg taatatccag cagcacagcg cgacgttccg gcacttgatc cagcccttcc 2700
 agcggcagaa ccgggaacaa ctggtcgatc ccccatgcgt ccggcatcga ctggaacagc 2760
 gagaagttga cgtacat ttt gtccgccata cgttcctgca gctcgtcgat aatcggacga 2820
 tgagcacggt tttgcggatc cagctgcttt tgcacttcat ggcacatgct caaataaagc 2880
 tgctcagccc atgcacgttc ttgcaggcta aagatgccgg aagagtagcc gatatgaatg 2940
 tcgtgcagat ccatctgact gtcgtgtaac cattcacgca gagaacggcg agttcccggt 3000
 tcgtgcatct cctgccagg tttccacatg ctttgcagcg cgcgcggcg atcttctgca 3060
 ggcgcggtcg gcaccgtgta ttcgttacgt tccacgccga tgatattaga caccagcacg 3120
 gtgtgatgcg cagtcacgc acgaccgat tcggtgatta ccgtcgatg cggcagaccg 3180
 ttttcttcac acgcacgccc aatcgcccag ataatgttgt tggcgtattc attgaggccg 3240
 tagttcaccg aacagtcgga ctgcgaacga gtaccttcat aatccacgcc cagaccgccg 3300
 ccgacgtcga agcactgaat attgacgccc agcttggtgca gttccacata gaaacgcgcg 3360
 gattcacgaa cgctgtgcg gatatcgca atattcgcca tctgcgaacc gaggtggaag 3420
 tgcagtagtt gcaggtgtc gagacgccc gcttcacgca gggtttcaac cagttgcagt 3480
 acctgagtcg cagccaggcc gaacttcgat ttttcccgc cggaggactg ccatttacc 3540
 gaaccctgcg aagccagacg tgcacgcacg ccagacgag gaacgacatt cagacgttct 3600
 gcttcatcca gcacaatggc gatttctgac atcttctcaa tgaccagata gaccttgtgc 3660
 cccatcttct cgccaattaa tgccaggcgg atatatcgc ggtctttata accgttgag 3720
 acgatgacgc tacgggtcat gccagcatgt gccagtactg ccatcaactc ggctttggaa 3780
 ccggcttcca gaccagcgg ttgcgccgaa tgaatcaggg actcaatcac gcggcggtgc 3840

11

89

agcgaaacgc gaactggatg aaatccgtga aagtttgcag gttaaacaga gtggctgggc 7320

gctgtttaaa gagaacagca acttccgccg cgcggtgttc cttggcgtag tgttgcaggt 7380

aatgcagcaa ttcaocggga tgaacgtcat catgtattac gcgccgaaaa tcttcgaact 7440

ggcgggttat accaactacta ccgagcaaata gtgggggacc gtgattgtcg gcctgaccaa 7500

cgtacttgcc acctttatcg caatcggcct tgttgaccgc tggggacgta aaccaacgct 7560

aacgctgggc ttccctggtga tggctgctgg catgggcgta ctcggtacaa tgatgcata 7620

cggtattcac tctccgtcgg cgcagtatct cgcctatcgc atgctgctga tgtttattgt 7680

cggttttgcc atgagtgcg gtccgctgat ttgggtactg tgctccgaaa ttcagccgct 7740

gaaaggccgc gatthttggca tcacctgctc cactgccacc aactggattg ccaacatgat 7800

cgttggcgca acgttcctga ccatgctcaa cagcgtgggt aacgccaaaca ccttctgggt 7860

gtatgcggct ctgaacgtac tgtttatcct gctgacattg tggctggtac cggaaaccaa 7920

acacgtttcg ctggaacata ttgaacgtaa tctgatgaaa ggtcgtaaac tgcgcgaaat 7980

aggcgctcac gattaatctc cccaagcttc ctcccatcgc ggaggaagcc acctcttgca 8040

gtcatctttt ctccgctcta tctctgccc ctatgaaaac atcccgctc cctatcgcca 8100

tccaacaggc cgttatgct cgcctgcggg aaaaactcgc ccaggccaac ctgaagctag 8160

ggcgtaacta cccggagcca aaactctctt acaccagcg cggaacctcc gccggaacgg 8220

cctggctgga aagctatgaa attcgctca atcccgtttt gctggtgga aacagtgaag 8280

cttttattga agaagtggta ccgcacgaac tggcacattt gctggtatgg aaacatttcg 8340

gccgcgtagc gccacatggc aaagagtgga agtggatgat ggaaaacgtg ctgggtgttc 8400

ccgccgctcg tacgcatcag ttcgaaactgc aatccgtgcg tcgcaacacc ttcccctacc 8460

gctgcaagtg ccaggagcat cagcttaccg tacgcgcga taatcgcgta gttcgtggcg 8520

aggcgtcta tcgctgtgtt cactgcggtg aacagctggt tgcgaaataa ccatctgaac 8580

tatcaggaac tttcctgata tggctgattg cataccaaaa cagctttcgc tacgttgctg 8640

gctcgtttta acacggagta agtgatgtac cgttatttgt ctattgctgc ggtggtagct 8700

agcgcagcat tttccggccc ggcgttgccc gaaggatatca atagtttttc tcaggcgaaa 8760

gccgcggcgg taaaagtcca cgctgacgcg cccggtacgt tttattgogg atgtaaaatt 8820

aactggcagg gcaaaaaagg cgttgttgat ctgcaatcgt gcggtatca ggtgcgcaaa 8880

aatgaaaacc gcgccagccg cgtagagtgg gaacatgctg ttcccgctg gcagttcgg 8940

19 20

ggacggtatg	ggcggcgcg	cgattttccg	cg	tgaagaa	ggcgatccaa	acctcggcgt	10740	
gattgccgaa accctgactg agcatggcac tcgctactgc atggcgcaaa attacctgcc							10800	
agccattaaa gatggcgaca aacgcgtgct ggtggtggat ggcgagccgg taccgtactg							10860	
cctggcgcg							attccgcagg ggggcgaaac ccgtggcaat ctggetgccc gtggtcgcgg	10920
tgaacctcgt ccgctgacgg aaagtgactg gaaaatcgcc cgtcagatcg ggccgacgct							10980	
gaaagaaaaa gggctgattt ttgttggctt ggatatcatc ggcgaccgtc tgactgaaat							11040	
taacgtcacc agcccaacct gtattcgtga gattgaagca gagtttccgg tgcgatcac							11100	
cggaatgtta atggatgcc							tcgaagcacg ttacagcag cagtaacca ccttagcgag	11160
aaggatctcg ttgagactct ga							gtg aca gcg ccc ttc ttt cca cgc ata ctg	11212
							Val Thr Ala Pro Phe Phe Pro Arg Ile Leu	
							1 5 10	
ggc gct gtt gct ttt ttg aac cag gaa aca gaa cct ctg aca atg aat							11260	
Gly Ala Val Ala Phe Leu Asn Gln Glu Thr Glu Pro Leu Thr Met Asn								
							15 20 25	
tta cag cat cac ttt ctt att gcc atg cct gct ctc cag gat ccg att							11308	
Leu Gln His His Phe Leu Ile Ala Met Pro Ala Leu Gln Asp Pro Ile								
							30 35 40	
ttc cgt cgt tcc gtg gtc tac att tgc gaa cat aat acc aat ggt gca							11356	
Phe Arg Arg Ser Val Val Tyr Ile Cys Glu His Asn Thr Asn Gly Ala								
							45 50 55	
atg ggg atc atc gtc aac aag ccg ctg gaa aat ctc aaa att gaa ggg							11404	
Met Gly Ile Ile Val Asn Lys Pro Leu Glu Asn Leu Lys Ile Glu Gly								
							60 65 70	
att ctg gaa aag ctg aag atc acg ccg gag ccg cgt gat gaa tca atc							11452	
Ile Leu Glu Lys Leu Lys Ile Thr Pro Glu Pro Arg Asp Glu Ser Ile								
							75 80 85 90	
cgt ctg gat aaa ccg gtt atg ctc ggc ggt ccg ctg gct gaa gat cgc							11500	
Arg Leu Asp Lys Pro Val Met Leu Gly Gly Pro Leu Ala Glu Asp Arg								
							95 100 105	
ggg ttt att ttg cat act ccg ccc tcc aat ttt gct tcc agc att cgc							11548	
Gly Phe Ile Leu His Thr Pro Pro Ser Asn Phe Ala Ser Ser Ile Arg								
							110 115 120	
att tca gac aac acg gta atg acc act tcc cgc gat gtg ctg gaa acg							11596	
Ile Ser Asp Asn Thr Val Met Thr Thr Ser Arg Asp Val Leu Glu Thr								
							125 130 135	
ctc ggc acc gat aaa caa ccg tct gac gta ttg gtg gct ctg ggt tat							11644	
Leu Gly Thr Asp Lys Gln Pro Ser Asp Val Leu Val Ala Leu Gly Tyr								
							140 145 150	

gcc tcc tgg gag aaa ggt caa ctg gaa caa gaa att ctc gat aac gcg 11692
 Ala Ser Trp Glu Lys Gly Gln Leu Glu Gln Glu Ile Leu Asp Asn Ala
 155 160 165 170

tgg cta acg gcc ccg gca gat ctg aat att ctg ttc aaa acg ccg att 11740
 Trp Leu Thr Ala Pro Ala Asp Leu Asn Ile Leu Phe Lys Thr Pro Ile
 175 180 185

gcc gac cgc tgg cgc gag gcg gca aaa ctg att ggt gtg gat att ctc 11788
 Ala Asp Arg Trp Arg Glu Ala Ala Lys Leu Ile Gly Val Asp Ile Leu
 190 195 200

acc atg cct ggt gtg gca gga cac gcc tga tgagtggaaac cttactcgcc 11838
 Thr Met Pro Gly Val Ala Gly His Ala
 205 210

ttcgacttcg qcaccaaaag cattggcgta gcggtcggcc aacgcattac cggcaccgct 11898

cgccctttgc ctgcaattaa agcacaggac ggtacgccgg actggaacat tatcgagcgt 11958

ttactgaaag agtggcagcc ggacgaaatc atcgtcgggt tgcgctgaa tatggacggc 12018

accgagcaac cattgactgc cagagcgcggt aaatttgcca accgtattca tggccggttc 12078

ggtgttgaag taaagctcca tgacgagcgt cttagcactg tggaagcccg ttccggtctg 12138

tttgaacagg gcggctatcg ggcgctcaac aaaggcaaag ttgactctgc ctctgcgggt 12198

attattctcg aaagctatct cgagcaggga tattaaggcg atttaaacgc ctggcggagt 12258

gtaaataata tcatcgcgtc ttattgccgg atgcggcggtg aacaccttat ccagcacaca 12318

tctggcagcg gctataggtc tgataagacg cgttag 12354

<210> 63

<211> 211

<212> PRT

<213> Escherichia coli

<400> 63

Val Thr Ala Pro Phe Phe Pro Arg Ile Leu Gly Ala Val Ala Phe Leu
 1 5 10 15

Asn Gln Glu Thr Glu Pro Leu Thr Met Asn Leu Gln His His Phe Leu
 20 25 30

Ile Ala Met Pro Ala Leu Gln Asp Pro Ile Phe Arg Arg Ser Val Val
 35 40 45

Tyr Ile Cys Glu His Asn Thr Asn Gly Ala Met Gly Ile Ile Val Asn
 50 55 60

Lys Pro Leu Glu Asn Leu Lys Ile Glu Gly Ile Leu Glu Lys Leu Lys
 65 70 75 80

Ile Thr Pro Glu Pro Arg Asp Glu Ser Ile Arg Leu Asp Lys Pro Val

```
<210> 64
<211> 10864
<212> DNA
<213> Escherichia coli

<220>
<221> CDS
<222> (8571)..(10769)
```

```
<400> 64
gttaaaaaaat taatcacctg ccaaaagaaa taaaaaagag aaagcctccg attaaattat 60
ttcgctacac tggttccact tttgtgattt acacgggtta cccatgaagc tgaccatcat 120
tcgattagaa aaatttagcg accaagaccg gattgacctg caaaagatct ggccggagta 180
ttccccttcc tcgttacagg ttgacgataa ccaccgtatc tacgcgcgcg gttttaacga 240
gcgcctgctc gctgcctgct gggtaacctt aagcggcacc gagggagcac tggattccct 300
gcgcgtgcgg gaagtcaccc gccgtcgcgg tgtggggcaa tatctgctgg aagaggtttt 360
gcgtaacaat cctggcgttt catgctggtg gatggcggat gcaggcgtgg aagatcgcgg 420
tgtgatgacg gcgtttatgc aggcgctggg gtttacggca caacagggcg gctgggagaa 480
gtgttaatcg tcaagtttga tttcaaaagt gatattgcct gatgcgctac gcttatcagg 540
cctacaatgt gtgttgcaat ttactgattt ctttgatct tgtaggccgg ataaggcggt 600
```

tacgccgcgat ccggcatgaa gcaacgtact cgaatttagc aattttggcgg caaccctaaag 660
ttgccgatta atgattactt cgcacgcgtc gccgtgccgt tggcgtgccca gtcaaatatcg 720
ccgaactcaa agccttttcag atcgcttttc tcatcccagg tcagcgggtcc cattacggta 780
tccacggagt tcgcttttcag gtattttggcg atttcagccg gatcgtcaga ctgattcagg 840
cccgcctgca aagattgcag cgcggcgtag gtgggtccaaa cgaatgcgcc acttgggtcc 900
tgttttttcg ctttgatcgc gtcaacaatg ggtttggtcg ccggaacctg atcgtagttc 960
ttcggcttgg tcaccagcag cccttcgcgt gattcgcccc caatgttaga cagcgaaacg 1020
ttagccacac cttccggccc cataaactga gttttcagcc ctgccgcgcg tgcctgacgc 1080
aggatttgcc ccatttcagg gtgataaccg ccgtagtaaa cgaagtcgat attctctttt 1140
ttcagacgcg ccaccagcgt tgagaaatct ttttcccgg cggatgatgc atcaaagaac 1200
accacgtttg cattgccttt cttcaggccg tcttgacccg ctgcgcgcag accttcgcgc 1260
tattgctgtt tgcgtgaac gatagcaata cgcgtcggtt tcactttctc aagaatatat 1320
ttcgccgcgc tgggcccctg gtcggagtc ccggccggtgg tgcgcaggat cagctgatag 1380
ccacggggcg tcagctccgg cgcgggttgc gctgggggtga tcattaaaat gccttcgtct 1440
tcgtagatgt cagacgcagg ctgcgttgat gaagaacaga ggtgaccaat cacatattta 1500
atgccgtcgt taacgacttt gttcgccacc gcaaccgcct gtttcgggtc acaggcatcg 1560
tcataatttta cgatttgagc tttgttgctt ttaatgcgc ctttagcggt gatatccga 1620
accgcctgct ctgcgcgggt aaactcctgg tcaccgtact gcgcaaccgg accggacatt 1680
gcgcccacga ccgcgacttt aatatcttct gccagagcca tattgctgaa tgccagcgcg 1740
atacatcctg ccagtaacgc tttaccttt atgttcatcc tgagaatccc cattcttctg 1800
gttattacgt gtgttgtgat gttgtttttc agcactttat ttcgttttat gcatgactac 1860
ccgtgcttta gcagcactat ctgctaaaac ataccgcgatt tttatgatat tggaatagct 1920
attttgacag tttattaaca atctgcgtgg ggattggcgt tttgccggag gggaaattga 1980
ttattacaga ggcccaaaaa acaaaaaccc cggactctca tccagggttc tctgcttaat 2040
agcggaaatt acgcttcaat ggcagcacgc aattttttca tcgcgttctt ttccagctgg 2100
cgtacacgct cagcggaaac gccgtaacgg tcagccagtt cctgcaacgt ggacttggtg 2160
tcttcgtcca gccagcgcgc acggatgatg tcttggtgct gttcgctcag acctgcac 2220
gcgtcggtca gacggtttgc cgcctgctct tcccagttat catcttcaat gcgcgcggca 2280
aagttagatg atttatcctg cagatagagc accggagcca tcggctggct gtcggaatcg 2340

gccgtggaag	gcatagcgca	cctgttcggt	gaaaacggtt	gttttgcgat	ttaccgggtt	4080
tggcgaggat	ttcgcgcggt	ttggtgcggt	acgaccgcgc	tcgcctgagc	cgccgaccga	4140
tttacggaag	cgatcaagac	gcccccaaaa	ctgccgaata	tgattgattg	catcgcgctt	4200
attcatggcc	cacgccctcca	tgcaagtgc	catcgctcag	ggtgagcatg	cgataggaac	4260
gccgcgagat	caggttgatg	tcgtgcggtt	ccatcaatac	ggttacccca	acgcggttaa	4320
actcttcaaa	cagacgtaaa	atgccttccg	acagcgcgtc	gtccaggtta	ccagtcgggt	4380
cgcccgccag	cagtaccgcg	ggcttgttca	ccaccgcgcg	ggcaatgcca	acacgctggt	4440
gttcaccgcc	cgaaagctga	atagggaagt	tcttcgcttt	gtccagtagc	ccgactttat	4500
ccagcgccgc	cgacaccgcg	cgacgaatat	cgtcaccgct	ggcaccggcg	ataatcagcg	4560
ggatcgccac	gttatcgtag	acagtacggt	ccatcagtag	atggtgatcc	tggaaaatca	4620
tgccaatctg	gcggcgcgaga	aacggaaact	cacggttttt	cagacgcgtg	atgtcatggc	4680
cgctaaaacca	gattttcccg	gcgctgggcc	gctcaatccc	acagatcagc	ttcaggaggg	4740
tacttttccc	tgcgcgga	tgaccggtca	gaaacgccat	ctcaccggc	tgcatatgga	4800
acgtaacgcc	ctgcagcgcc	tgtctccac	cgagataagc	cttgctgaca	tgttcaaagc	4860
gaatcattgt	taatcctctc	gggcaaaaag	tgcctctata	aagtcgtccg	ccttaaacgg	4920
acgcaaatacc	tcaatacggt	cgccgacacc	aatgtagcgg	atagggatac	caaactggtc	4980
agccacgag	aaaattaccc	cgcttttcgc	cgtgccgtcc	agtttcgtta	gcgtgatgcc	5040
ggttaagcca	acggcttcat	ggaacagttt	ggcctggctt	accgcgttct	gcccggtgct	5100
ggcatcaata	gtcagcataa	cttcatgcgg	cgcttcaacg	tcgagtttct	tcatcacgcg	5160
gacgattttc	ttcaactctt	ccatcaggtg	cgatttggtc	tgcaggcgtc	cggtgtatc	5220
ggcaatcagg	acgtcgatat	tacgcgcttt	agctgcctga	atggcgtcga	agataacaga	5280
ggcggaatcc	gccccggtat	gctgggcaat	caccggaata	ttgttgcgct	gaccccgagc	5340
ctgaagctgt	tcaaccgcag	ctgcacggaa	agtatcacc	gccgccagca	tcaaccgattt	5400
accctgctgc	tcaaactgac	gcgccagctt	accaatcgtc	gtggttttac	ccacaccggt	5460
gacgccccacc	atcaggatca	caaacggcgc	tttgcccttca	acattcagcg	gctcatcgac	5520
tttcgccaga	atctcgccca	tctcttcttt	cagcaggcca	tagagcgctt	cggcgtcacg	5580
aagctgcttg	cgggatgcgc	cttcggtcag	attggtgata	attttacgtg	tggtttccac	5640
accacatcg	gcatcaaaa	gctgctcttc	cagctcctca	aacagatcat	cgtcgatttt	5700
tttaccgcgg	aacaggctga	taaatccgga	accgagattt	tctttggttt	ttaacaggct	5760

gcgtttcagg cgcgcgaaaa aaccttcttt ggtcggtttt tcctgctcct gagcgatttc 5820
 ttccaccggc tgetcttctt ctgccggagg aaccaccatc accgcctctt ctgccgcttc 5880
 ggcagccagc gccgtttcca gctcttcgtc ggtaatttct tctttagccg cttctttctc 5940
 cgccgcttcg acaatctcta cggtttccgc ttcagcctgc cactcttctg gcgaaaccgc 6000
 ttccggcgttg acgtcttccg gcaacggcag ctcttcacgt tcgatagcca ctggctccgg 6060
 cgtttcttct acgaccggtt ccggctgtgc aacgacttcc gcttcaggct gcgctttttc 6120
 actttcagca acctgttcag tgacttccac aacgtcggca gcaaaagttt ccgcctcggc 6180
 ttcagtatgc gcttgccggt gctcttcaac ggcttggtca gaggccttca caggctcttg 6240
 cgctgaacg atttcttcta caaccggttg ttcattctga acttctgtct ctttttccgg 6300
 ggtctgctct ttttgaccaa agcccagcca ggaaaaaag ccacgttttt tttctttcgc 6360
 catttgcgac tacactcctc gctgttgctt catggcacag cgttaacgct atgtacatag 6420
 cagctaaaaa aatgatgaaa tagtctatca cttaacttaa ttcacatcac cgcctgcaag 6480
 tatgtgttat ctggcggatt gagcaattta tcatgaaaaa accgaatcat tccggcagcg 6540
 gccaaatccg cattattggc gggcagtggc gaggcgtaa actcccggtt cctgatagcc 6600
 caggctctgc ccccaccacc gaccgcgtac gcgaaacgtt gtttaactgg ctggctccgg 6660
 tcattgttga cgcccaatgt ctggattgct tcgccgggag cggcgcgctg gggctggaag 6720
 cgttatcgcg ctacgctgcg ggggcaacgt tgattgagat ggatcgcgcg gttctcagc 6780
 agttaattaa gaatctggcg acactaaaag caggcaatgc acgcgtggtg aacagcaacg 6840
 cgatgtcatt cctggcgcaa aaaggtacac cgcataatat cgtgtttgtc gatccaccgt 6900
 tccgcctggg cttgttagaa gagacgataa atttactgga agataacggc tggctggctg 6960
 acgaagccct gatttatgtc gaaagcgaag tcgaaaacgg tctgcccact gttccagcaa 7020
 actggtcatt acatcgggaa aaagtggcgg gtcaggtggc ttatcggtg tatcaacgcg 7080
 aagcacaagg agaaagtgat gctgattaat attggtcgtt tgtaaatgct ctgcgtttgg 7140
 ggatttttaa tctcaacct ggtgcatccc tccccacgcc cgtgaatat cttcgttaac 7200
 gtggcgctga tttttaccgt gctgatgcat ggtatgcagc tggcgctatt gaaatccact 7260
 ttaccgaaag atggcccgca gatgaccacc gccgaaaagg tacggatttt ctttttcggc 7320
 gtgtttgaac tgctggcctg gcagaagaaa tttaaagtta aaaaataacc ttattgttcg 7380
 cctacaaagc tgacaaagcg cgttccttta tagctcagcg tacctttatc gccactgtc 7440

Glu	Asn	Ala	Val	Arg	Gln	Leu	Ala	Gly	Val	Asn	Gln	Val	Gln	Val	Leu	
			70				75						80			
ttc	gcc	acc	gaa	aaa	ctg	gtg	gtc	gat	gcc	gac	aat	gac	att	cgt	gca	8864
Phe	Ala	Thr	Glu	Lys	Leu	Val	Val	Asp	Ala	Asp	Asn	Asp	Ile	Arg	Ala	
			85				90						95			
caa	gtt	gaa	tct	gcg	ctg	caa	aaa	gca	ggc	tat	tcc	ctg	cgc	gat	gaa	8912
Gln	Val	Glu	Ser	Ala	Leu	Gln	Lys	Ala	Gly	Tyr	Ser	Leu	Arg	Asp	Glu	
			100				105						110			
cag	gcc	gcc	gaa	gaa	ccg	caa	gca	tca	cgc	ctg	aaa	gag	aat	ctg	ccg	8960
Gln	Ala	Ala	Glu	Glu	Pro	Gln	Ala	Ser	Arg	Leu	Lys	Glu	Asn	Leu	Pro	
			115				120						125	130		
ctg	att	acg	cta	atc	gtg	atg	atg	gca	atc	agc	tgg	ggc	ctg	gag	cag	9008
Leu	Ile	Thr	Leu	Ile	Val	Met	Met	Ala	Ile	Ser	Trp	Gly	Leu	Glu	Gln	
			135						140						145	
ttc	aat	cat	ccg	ttc	ggg	caa	ctg	gcg	ttt	atc	gcg	acc	acg	ctg	gtt	9056
Phe	Asn	His	Pro	Phe	Gly	Gln	Leu	Ala	Phe	Ile	Ala	Thr	Thr	Leu	Val	
			150						155						160	
ggg	ctg	tac	ccg	att	gct	cgt	cag	gca	tta	cgg	ttg	atc	aaa	tcc	ggc	9104
Gly	Leu	Tyr	Pro	Ile	Ala	Arg	Gln	Ala	Leu	Arg	Leu	Ile	Lys	Ser	Gly	
			165						170						175	
agc	tac	ttc	gcc	att	gaa	acc	tta	atg	agc	gta	gcc	gct	att	ggc	gca	9152
Ser	Tyr	Phe	Ala	Ile	Glu	Thr	Leu	Met	Ser	Val	Ala	Ala	Ile	Gly	Ala	
			180						185						190	
ctg	ttt	att	ggc	gca	acg	gct	gaa	gct	gcg	atg	gtg	ttg	ctg	ctg	ttt	9200
Leu	Phe	Ile	Gly	Ala	Thr	Ala	Glu	Ala	Ala	Met	Val	Leu	Leu	Leu	Phe	
			195						200						205	
ttg	att	ggc	gaa	cga	ctg	gaa	ggc	tgg	gcc	gcc	agc	cgc	gcg	cgt	cag	9248
Leu	Ile	Gly	Glu	Arg	Leu	Glu	Gly	Trp	Ala	Ala	Ser	Arg	Ala	Arg	Gln	
			215						220						225	
ggc	gtt	agc	gcg	tta	atg	gcg	ctg	aaa	cca	gaa	acc	gcc	acg	cgc	ctg	9296
Gly	Val	Ser	Ala	Leu	Met	Ala	Leu	Lys	Pro	Glu	Thr	Ala	Thr	Arg	Leu	
			230						235						240	
cgt	aag	ggc	gag	cgg	gaa	gag	gtg	gcg	att	aac	agc	ctg	cgc	cct	ggc	9344
Arg	Lys	Gly	Glu	Arg	Glu	Glu	Val	Ala	Ile	Asn	Ser	Leu	Arg	Pro	Gly	
			245						250						255	
gat	gtg	att	gaa	gtc	gcc	gca	ggc	ggg	cgt	ttg	cct	gcc	gac	ggc	aaa	9392
Asp	Val	Ile	Glu	Val	Ala	Ala	Gly	Gly	Arg	Leu	Pro	Ala	Asp	Gly	Lys	
			260						265						270	
ctg	ctc	tca	ccg	ttt	gcc	agt	ttt	gat	gaa	agc	gcc	ctg	acc	ggc	gaa	9440
Leu	Leu	Ser	Pro	Phe	Ala	Ser	Phe	Asp	Glu	Ser	Ala	Leu	Thr	Gly	Glu	
			275						280						285	
tcc	att	ccg	gtg	gag	cgc	gca	acg	ggc	gat	aaa	gtc	cct	gct	ggc	gcc	9488
Ser	Ile	Pro	Val	Glu	Arg	Ala	Thr	Gly	Asp	Lys	Val	Pro	Al			

295								300				305				
acc	agc	gta	gac	cgt	ctg	gtg	acg	ttg	gaa	gtg	ctg	tca	gaa	ccg	gga	9536
Thr	Ser	Val	Asp	Arg	Leu	Val	Thr	Leu	Glu	Val	Leu	Ser	Glu	Pro	Gly	
310				315				320								
gcc	agc	gcc	att	gac	cgg	att	ctg	aaa	ctg	atc	gaa	gaa	gcc	gaa	gag	9584
Ala	Ser	Ala	Ile	Asp	Arg	Ile	Leu	Lys	Leu	Ile	Glu	Glu	Ala	Glu	Glu	
325				330				335								
cgt	cgc	gct	ccc	att	gag	cgg	ttt	atc	gac	cgt	ttc	agc	cgt	atc	tat	9632
Arg	Arg	Ala	Pro	Ile	Glu	Arg	Phe	Ile	Asp	Arg	Phe	Ser	Arg	Ile	Tyr	
340				345				350								
acg	ccc	gcg	att	atg	gcc	gtc	gct	ctg	ctg	gtg	acg	ctg	gtg	cca	ccg	9680
Thr	Pro	Ala	Ile	Met	Ala	Val	Ala	Leu	Leu	Val	Thr	Leu	Val	Pro	Pro	
355				360				365				370				
ctg	ctg	ttt	gcc	gcc	agc	tgg	cag	gag	tgg	att	tat	aaa	ggg	ctg	acg	9728
Leu	Leu	Phe	Ala	Ala	Ser	Trp	Gln	Glu	Trp	Ile	Tyr	Lys	Gly	Leu	Thr	
375				380				385								
ctg	ctg	ctg	att	ggc	tgc	ccg	tgt	gcg	tta	gtt	atc	tca	acg	cct	gcg	9776
Leu	Leu	Leu	Ile	Gly	Cys	Pro	Cys	Ala	Leu	Val	Ile	Ser	Thr	Pro	Ala	
390				395				400								
gcg	att	acc	tcc	ggg	ctg	gcg	gcg	gca	gcg	cgt	cgt	ggg	gcg	ttg	att	9824
Ala	Ile	Thr	Ser	Gly	Leu	Ala	Ala	Ala	Ala	Arg	Arg	Gly	Ala	Leu	Ile	
405				410				415								
aaa	ggc	gga	gcg	gcg	ctg	gaa	cag	ctg	ggt	cgt	gtt	act	cag	gtg	gcg	9872
Lys	Gly	Gly	Ala	Ala	Leu	Glu	Gln	Leu	Gly	Arg	Val	Thr	Gln	Val	Ala	
420				425				430								
ttt	gat	aaa	acc	ggt	acg	ctg	acc	gtc	ggt	aaa	ccg	cgc	gtt	acc	gcg	9920
Phe	Asp	Lys	Thr	Gly	Thr	Leu	Thr	Val	Gly	Lys	Pro	Arg	Val	Thr	Ala	
435				440				445				450				
att	cat	ccg	gca	acg	ggt	att	agt	gaa	tct	gaa	ctg	ctg	aca	ctg	gcg	9968
Ile	His	Pro	Ala	Thr	Gly	Ile	Ser	Glu	Ser	Glu	Leu	Leu	Thr	Leu	Ala	
455				460				465								
gcg	gcg	gtc	gag	caa	ggc	gcg	acg	cat	cca	ctg	gcg	caa	gcc	atc	gta	10016
Ala	Ala	Val	Glu	Gln	Gly	Ala	Thr	His	Pro	Leu	Ala	Gln	Ala	Ile	Val	
470				475				480								
cgc	gaa	gca	cag	gtt	gct	gaa	ctc	gcc	att	ccc	acc	gcc	gaa	tca	cag	10064
Arg	Glu	Ala	Gln	Val	Ala	Glu	Leu	Ala	Ile	Pro	Thr	Ala	Glu	Ser	Gln	
485				490				495								
cgg	gcg	ctg	gtc	ggg	tct	ggc	att	gaa	gcg	cag	gtt	aac	ggt	gag	cgc	10112
Arg	Ala	Leu	Val	Gly	Ser	Gly	Ile	Glu	Ala	Gln	Val	Asn	Gly	Glu	Arg	
500				505				510								
gta	ttg	att	tgc	gct	gcc	ggg	aaa	cat	ccc	gct	gat	gca	ttt	act	ggt	10160
Val	Leu	Ile	Cys	Ala	Ala	Gly	Lys	His	Pro	Ala	Asp	Ala	Phe	Thr	Gly	
515				520				525				530				

tta att aac gaa ctg gaa agc gcc ggg caa acg gta gtg ctg gta gta 10208
 Leu Ile Asn Glu Leu Glu Ser Ala Gly Gln Thr Val Val Leu Val Val
 535 540 545

cgt aac gat gac gtg ctt ggt gtc att gcg tta cag gat acc ctg cgc 10256
 Arg Asn Asp Asp Val Leu Gly Val Ile Ala Leu Gln Asp Thr Leu Arg
 550 555 560

gcc gat gct gca act gcc atc agt gaa ctg aac gcg ctg ggc gtc aaa 10304
 Ala Asp Ala Ala Thr Ala Ile Ser Glu Leu Asn Ala Leu Gly Val Lys
 565 570 575

ggg gtg atc ctc acc ggc gat aat cca cgc gca gcg gcg gca att gcc 10352
 Gly Val Ile Leu Thr Gly Asp Asn Pro Arg Ala Ala Ala Ala Ile Ala
 580 585 590

ggg gag ctg ggg ctg gag ttt aaa gcg ggc ctg ttg ccg gaa gat aaa 10400
 Gly Glu Leu Gly Leu Glu Phe Lys Ala Gly Leu Leu Pro Glu Asp Lys
 595 600 605 610

gtc aaa gcg gtg acc gag ctg aat caa cat gcg ccg ctg gcg atg gtc 10448
 Val Lys Ala Val Thr Glu Leu Asn Gln His Ala Pro Leu Ala Met Val
 615 620 625

ggt gac ggt att aac gac gcg cca gcg atg aaa gct gcc gcc atc ggg 10496
 Gly Asp Gly Ile Asn Asp Ala Pro Ala Met Lys Ala Ala Ala Ile Gly
 630 635 640

att gca atg ggt agc ggc aca gac gtg gcg ctg gaa acc gcc gac gca 10544
 Ile Ala Met Gly Ser Gly Thr Asp Val Ala Leu Glu Thr Ala Asp Ala
 645 650 655

gca tta acc cat aac cac ctg cgc ggc ctg gtg caa atg att gaa ctg 10592
 Ala Leu Thr His Asn His Leu Arg Gly Leu Val Gln Met Ile Glu Leu
 660 665 670

gca cgc gcc act cac gcc aat atc cgc cag aac atc act att gcg ctg 10640
 Ala Arg Ala Thr His Ala Asn Ile Arg Gln Asn Ile Thr Ile Ala Leu
 675 680 685 690

ggg ctg aaa ggg atc ttc ctc gtc acc acg ctg tta ggg atg acc ggg 10688
 Gly Leu Lys Gly Ile Phe Leu Val Thr Thr Leu Leu Gly Met Thr Gly
 695 700 705

ttg tgg ctg gca gtg ctg gca gat acg ggg gcg acg gtg ctg gtg aca 10736
 Leu Trp Leu Ala Val Leu Ala Asp Thr Gly Ala Thr Val Leu Val Thr
 710 715 720

gcg aat gcg tta aga ttg ttg cgc agg aga taa ggcaaaccga tcgcaacatt 10789
 Ala Asn Ala Leu Arg Leu Leu Arg Arg Arg
 725 730

gagcgcgatac ggtccctctcg cccctctggg gagaggggta ggggtgagggg aaaaggcggc 10849

atcgaagcca atcag 10864

<210> 65
 <211> 732
 <212> PRT
 <213> Escherichia coli

<400> 65

Met Ser Thr Pro Asp Asn His Gly Lys Lys Ala Pro Gln Phe Ala Ala
 1 5 10 15

Phe Lys Pro Leu Thr Thr Val Gln Asn Ala Asn Asp Cys Cys Cys Asp
 20 25 30

Gly Ala Cys Ser Ser Thr Pro Thr Leu Ser Glu Asn Val Ser Gly Thr
 35 40 45

Arg Tyr Ser Trp Lys Val Ser Gly Met Asp Cys Ala Ala Cys Ala Arg
 50 55 60

Lys Val Glu Asn Ala Val Arg Gln Leu Ala Gly Val Asn Gln Val Gln
 65 70 75 80

Val Leu Phe Ala Thr Glu Lys Leu Val Val Asp Ala Asp Asn Asp Ile
 85 90 95

Arg Ala Gln Val Glu Ser Ala Leu Gln Lys Ala Gly Tyr Ser Leu Arg
 100 105 110

Asp Glu Gln Ala Ala Glu Glu Pro Gln Ala Ser Arg Leu Lys Glu Asn
 115 120 125

Leu Pro Leu Ile Thr Leu Ile Val Met Met Ala Ile Ser Trp Gly Leu
 130 135 140

Glu Gln Phe Asn His Pro Phe Gly Gln Leu Ala Phe Ile Ala Thr Thr
 145 150 155 160

Leu Val Gly Leu Tyr Pro Ile Ala Arg Gln Ala Leu Arg Leu Ile Lys
 165 170 175

Ser Gly Ser Tyr Phe Ala Ile Glu Thr Leu Met Ser Val Ala Ala Ile
 180 185 190

Gly Ala Leu Phe Ile Gly Ala Thr Ala Glu Ala Ala Met Val Leu Leu
 195 200 205

Leu Phe Leu Ile Gly Glu Arg Leu Glu Gly Trp Ala Ala Ser Arg Ala
 210 215 220

Arg Gln Gly Val Ser Ala Leu Met Ala Leu Lys Pro Glu Thr Ala Thr
 225 230 235 240

Arg Leu Arg Lys Gly Glu Arg Glu Glu Val Ala Ile Asn Ser Leu Arg
 245 250 255

Pro Gly Asp Val Ile Glu Val Ala Ala Gly Gly Arg Leu Pro Ala Asp
 260 265 270

Gly Lys Leu Leu Ser Pro Phe Ala Ser Phe Asp Glu Ser Ala Leu Thr
 275 280 285
 Gly Glu Ser Ile Pro Val Glu Arg Ala Thr Gly Asp Lys Val Pro Ala
 290 295 300
 Gly Ala Thr Ser Val Asp Arg Leu Val Thr Leu Glu Val Leu Ser Glu
 305 310 315 320
 Pro Gly Ala Ser Ala Ile Asp Arg Ile Leu Lys Leu Ile Glu Glu Ala
 325 330 335
 Glu Glu Arg Arg Ala Pro Ile Glu Arg Phe Ile Asp Arg Phe Ser Arg
 340 345 350
 Ile Tyr Thr Pro Ala Ile Met Ala Val Ala Leu Leu Val Thr Leu Val
 355 360 365
 Pro Pro Leu Leu Phe Ala Ala Ser Trp Gln Glu Trp Ile Tyr Lys Gly
 370 375 380
 Leu Thr Leu Leu Leu Ile Gly Cys Pro Cys Ala Leu Val Ile Ser Thr
 385 390 395 400
 Pro Ala Ala Ile Thr Ser Gly Leu Ala Ala Ala Arg Arg Gly Ala
 405 410 415
 Leu Ile Lys Gly Gly Ala Ala Leu Glu Gln Leu Gly Arg Val Thr Gln
 420 425 430
 Val Ala Phe Asp Lys Thr Gly Thr Leu Thr Val Gly Lys Pro Arg Val
 435 440 445
 Thr Ala Ile His Pro Ala Thr Gly Ile Ser Glu Ser Glu Leu Leu Thr
 450 455 460
 Leu Ala Ala Ala Val Glu Gln Gly Ala Thr His Pro Leu Ala Gln Ala
 465 470 475 480
 Ile Val Arg Glu Ala Gln Val Ala Glu Leu Ala Ile Pro Thr Ala Glu
 485 490 495
 Ser Gln Arg Ala Leu Val Gly Ser Gly Ile Glu Ala Gln Val Asn Gly
 500 505 510
 Glu Arg Val Leu Ile Cys Ala Ala Gly Lys His Pro Ala Asp Ala Phe
 515 520 525
 Thr Gly Leu Ile Asn Glu Leu Glu Ser Ala Gly Gln Thr Val Val Leu
 530 535 540
 Val Val Arg Asn Asp Asp Val Leu Gly Val Ile Ala Leu Gln Asp Thr
 545 550 555 560
 Leu Arg Ala Asp Ala Ala Thr Ala Ile Ser Glu Leu Asn Ala Leu Gly
 565 570 575

Val Lys Gly Val Ile Leu Thr Gly Asp Asn Pro Arg Ala Ala Ala Ala
580 585 590

Ile Ala Gly Glu Leu Gly Leu Glu Phe Lys Ala Gly Leu Leu Pro Glu
595 600 605

Asp Lys Val Lys Ala Val Thr Glu Leu Asn Gln His Ala Pro Leu Ala
610 615 620

Met Val Gly Asp Gly Ile Asn Asp Ala Pro Ala Met Lys Ala Ala Ala
625 630 635 640

Ile Gly Ile Ala Met Gly Ser Gly Thr Asp Val Ala Leu Glu Thr Ala
645 650 655

Asp Ala Ala Leu Thr His Asn His Leu Arg Gly Leu Val Gln Met Ile
660 665 670

Glu Leu Ala Arg Ala Thr His Ala Asn Ile Arg Gln Asn Ile Thr Ile
675 680 685

Ala Leu Gly Leu Lys Gly Ile Phe Leu Val Thr Thr Leu Leu Gly Met
690 695 700

Thr Gly Leu Trp Leu Ala Val Leu Ala Asp Thr Gly Ala Thr Val Leu
705 710 715 720

Val Thr Ala Asn Ala Leu Arg Leu Leu Arg Arg Arg
725 730

<210> 66

<211> 10180

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (190)..(771)

<400> 66

tgcgagtaag aattatgagg aatggctatc agtattgtca ttttcagaaa atatttatcc 60

tgcacgcgtg agtcagagta agatcagact tttgctaaat tcgcaaaaga ctttgcacat 120

tttgctaatt tcaccgtacc gctctgtgac gtactatagt cggcaaacgt ctcaccttga 180

ggttaaaaa atg agc aac atc ctg att atc aac ggc gcg aaa aaa ttc gcc 231

Met Ser Asn Ile Leu Ile Ile Asn Gly Ala Lys Lys Phe Ala

1

5

10

cac tcc aat ggt caa ctg aac gac acc ctg acc gaa gtc gcg gat ggc 279

His Ser Asn Gly Gln Leu Asn Asp Thr Leu Thr Glu Val Ala Asp Gly

15

20

25

30

aca ctg cgc gac ctt ggg cat gat gtc cgc atc gtt cgc gcc gac agc 327

gatcaccggt aactactatc cggaactggc tgcgctgaat gtcgaaaact ttaaaaccga 6451
caaaccacag cgggttaacg cgtgctgaa agaagccgaa aaacgcaacc tgtcgtgtt 6511
acaggcacgc ttgagccagg acctggcgcg cgagcaaatt cgccaggcgc aggatgggtca 6571
cttaccgact ctggatttaa cggcttctac cgggatttct gacacctctt atagcggttc 6631
gaaaaccggt ggtgccgctg gtaccagta tgacgatagc aatatgggcc agaacaaagt 6691
tggcctgagc ttctcgtgc cgatttatca gggcggaatg gttaactcgc aggtgaaaca 6751
ggcacagtac aactttgtcg gtgccagoga gcaactggaa agtgcccatc gtagcgtcgt 6811
gcagaccgtg cgttctctct tcaacaacat taatgcatct atcagtagca ttaacgccta 6871
caaacaagcc gtagtttccg ctcaaagctc attagacgcg atggaagcgg gctactcgg 6931
cggtagcgt accattgttg atgtgttga tgcgaccacc acgttgtaca acgccaagca 6991
agagctggcg aatgcgcgtt ataactacct gattaatcag ctgaatatta agtcagctct 7051
gggtacgttg aacgagcagg atctgctggc actgaacaat gcgctgagca aaccggtttc 7111
cactaatccg gaaaacgttg caccgcaaac gccggaacag aatgctattg ctgatgggtta 7171
tgcgctgat agccggcac cagtcgttca gcaaacatcc gcacgcacta ccaccagtaa 7231
cggtcataac ctttccgta actgatgacg acgacggggc ttcggccccg tctgaacgta 7291
aggcaacgta aagatacggg ttatctgccg cattcttccc ctttctcgt tcaatttcga 7351
ccagccatcc tctattctga tgggtattta cactgggtcc cggaagacaa aatgaaacg 7411
gacaaaatcc atacgccacg catcgttccg caaaaactgg agcgcacgcc atctgacacc 7471
agtcgtcttc gcggttgcca ctgtttttat gctggctggc tgtgaaaaga gtgatgaaac 7531
agtgtctctc tatcaaatg ctgacgactg ttcagctgca aaccaggca aaagcgccga 7591
atgtaccacc gcgtacaaca atgcgctgaa agaagccgaa cgtactgcgc cgaaatacgc 7651
caccgtgaa gactgtgttg ctgaatttg tgaaggtcag tgccagcagg caccagccca 7711
ggctggcatg gcaccagaaa accaggcgca ggcccagcaa tccagcggga gtttctggat 7771
gccgctgatg gccggttaca tgatggggcg tctgatgggc gccggcgcg gatttgaca 7831
gcagccgctg ttctctcga aaaaccagc cagtccggct tacggtaa ataccgacgc 7891
gacgggtaaa aactatggcg cagcccagcc aggccgcacc atgaccgtac cgaagacggc 7951
aatggcacca aaaccggcga ccaccactac cgttaccgt ggcggttttg gtgaatctgt 8011
tgccaaacaa agcactatgc agcgtagtgc aaccggtacc tcttctcgtt caatgggtgg 8071
ctgataccga tggaaagagt cagtattacc gagcgcccg actggcgtga gaaagccac 8131

gcgaacccgg agcaggataa tgcgtatcgt acagcgccgtg cgggaagcca ccaaagtcac 9871
 gaatcgtggg cggcgtctcc atcgcgggtca ctctgtttcc acgggtaaac cagtgagccg 9931
 aaaccaccac aatcgccttg gggcgtggca atgtcatccc caacttctgc cagctgctggg 9991
 tatacaaatt atcttccagc acgttcatcg gactaccgtg acctaaaaac aatgctggca 10051
 tacgtgttga agacatgatg atatccttaa ctaaagggtgt cattttgata tcctcacaat 10111
 acgcttggtc ggcggagtaa gaacccggat aacaatgatg atgatcatca gttattttga 10171
 cgatctgcc 10180

<210> 67

<211> 193

<212> PRT

<213> Escherichia coli

<400> 67

Met Ser Asn Ile Leu Ile Ile Asn Gly Ala Lys Lys Phe Ala His Ser
 1 5 10 15

Asn Gly Gln Leu Asn Asp Thr Leu Thr Glu Val Ala Asp Gly Thr Leu
 20 25 30

Arg Asp Leu Gly His Asp Val Arg Ile Val Arg Ala Asp Ser Asp Tyr
 35 40 45

Asp Val Lys Ala Glu Val Gln Asn Phe Leu Trp Ala Asp Val Val Ile
 50 55 60

Trp Gln Met Pro Gly Trp Trp Met Gly Ala Pro Trp Thr Val Lys Lys
 65 70 75 80

Tyr Ile Asp Asp Val Phe Thr Glu Gly His Gly Thr Leu Tyr Ala Ser
 85 90 95

Asp Gly Arg Thr Arg Lys Asp Pro Ser Lys Lys Tyr Gly Ser Gly Gly
 100 105 110

Leu Val Gln Gly Lys Lys Tyr Met Leu Ser Leu Thr Trp Asn Ala Pro
 115 120 125

Met Glu Ala Phe Thr Glu Lys Asp Gln Phe Phe His Gly Val Gly Val
 130 135 140

Asp Gly Val Tyr Leu Pro Phe His Lys Ala Asn Gln Phe Leu Gly Met
 145 150 155 160

Glu Pro Leu Pro Thr Phe Ile Ala Asn Asp Val Ile Lys Met Pro Asp
 165 170 175

Val Pro Arg Tyr Thr Glu Glu Tyr Arg Lys His Leu Val Glu Ile Phe
 180 185 190

gtgagatctt aagcctgcgc gaaccgaagt cgctggcgat ttgtacgctg ctggataaac 3120
 cgtcccgtcg tgaagtgaac gtcccggtag aatttatcgg tttctcgatc ccggatgagt 3180
 ttgtggtggg ttacggcatt gattacgcac agcgttaccg tcatctgccg tatatcggca 3240
 aagtgattct gctggacgag taagtgtgaa gttgccggat gtgttgcatc cggcatggca 3300
 tttttatttg tggttggcgt gtttcagctt gaggttggaa atcccgtgac ggtaacgttg 3360
 ctcaaggggt tcgcggttgg tggcggtaac atccagatca cgcagcaagc cgtcgtgaat 3420
 gccgtaggcc cagccgtgaa tggtaacttt ctgccgcgtt ttccacgctg attgcataat 3480
 ggtggagtgg cccaggttat acacctgttc catgacgttc agttcacaca aggtatccag 3540
 acggcgctct tgcggcattt cgcgagcaa tgagctatgt ttgaaccaga tatcgcggat 3600
 atgcagcagc cagttgttga taagccccag ttccgggttt tcaactgcgg cttgtacgcc 3660
 gccgcaaccg tagtgggcac agataataat gtgttcaact tcgagtacat ccaactgcata 3720
 ctgaaccacg gaaaggcagt tcaggtcagt gtgaatgacc aggttagcaa cattacggtg 3780
 aacaaagagt tcgcccggct caagaccggt taaacgttct gcaggaacgc gactgtcgga 3840
 acatccaatc catagaaagc gcggtttttg cgcttgtgcc agtttctcaa aaaaccggg 3900
 atcctcttcc accagcattt ttgaccatag tgcattgttg ctgatgagtg tatctatgtc 3960
 tttcatggag gttaacgacc tgtaacaaaa taattacgtt tggctaatat agggcaactc 4020
 cgggacgatt taaaccacag ataaagtgtg agaacgtaag gtaagtaaaa attt atg 4077
Met
1

acc att gca ctg gaa ctt caa cag ctt aaa aaa acc tat cca ggc ggc 4125
 Thr Ile Ala Leu Glu Leu Gln Gln Leu Lys Lys Thr Tyr Pro Gly Gly
5 10 15

gtt cag gcg ctt cgt ggg ata gat ttg cag gtc gaa gcg ggt gat ttt 4173
 Val Gln Ala Leu Arg Gly Ile Asp Leu Gln Val Glu Ala Gly Asp Phe
20 25 30

tat gcg ctt ctc ggg ccg aac ggg gcc ggg aaa tcg acc act atc ggt 4221
 Tyr Ala Leu Leu Gly Pro Asn Gly Ala Gly Lys Ser Thr Thr Ile Gly
35 40 45

att atc agc tct ctg gta aat aaa acc tcc ggg cgg gtc agc gta ttt 4269
 Ile Ile Ser Ser Leu Val Asn Lys Thr Ser Gly Arg Val Ser Val Phe
50 55 60 65

ggt tac gat ctc gag aag gat gtc gtg aac got aaa cgt cag ttg gga 4317
 Gly Tyr Asp Leu Glu Lys Asp Val Val Asn Ala Lys Arg Gln Leu Gly
70 75 80

ctg gtg ccg cag gaa ttt aac ttc aac ccg ttt gaa acc gtg cag caa	4365
Leu Val Pro Gln Glu Phe Asn Phe Asn Pro Phe Glu Thr Val Gln Gln	
85 90 95	
att gtg gtg aat cag gca ggg tac tac ggc gtg gag cgc aaa gaa gcg	4413
Ile Val Val Asn Gln Ala Gly Tyr Tyr Gly Val Glu Arg Lys Glu Ala	
100 105 110	
tac atc cgc agc gaa aag tat ott aaa caa ctc gat cta tgg gga aaa	4461
Tyr Ile Arg Ser Glu Lys Tyr Leu Lys Gln Leu Asp Leu Trp Gly Lys	
115 120 125	
cgc aac gaa cgt gcg cgt atg tta tct ggc ggg atg aag cgc cgt tta	4509
Arg Asn Glu Arg Ala Arg Met Leu Ser Gly Gly Met Lys Arg Arg Leu	
130 135 140 145	
atg att gcc cgt gcg tta atg cat gaa cct aaa cta ctg att ctc gac	4557
Met Ile Ala Arg Ala Leu Met His Glu Pro Lys Leu Leu Ile Leu Asp	
150 155 160	
gaa ccg acc gca ggc gtg gat att gaa ctt cgc cgc tca atg tgg ggc	4605
Glu Pro Thr Ala Gly Val Asp Ile Glu Leu Arg Arg Ser Met Trp Gly	
165 170 175	
ttt ttg aag gat tta aac gac aaa ggc acc acc atc att ctc acc aca	4653
Phe Leu Lys Asp Leu Asn Asp Lys Gly Thr Thr Ile Ile Leu Thr Thr	
180 185 190	
cac tac ctg gaa gaa gca gaa atg ctg tgc cgc aat atc ggc att att	4701
His Tyr Leu Glu Glu Ala Glu Met Leu Cys Arg Asn Ile Gly Ile Ile	
195 200 205	
caa cac ggt gag ctg gtg gaa aat acc tcg atg aag gcg ctg ctg gcg	4749
Gln His Gly Glu Leu Val Glu Asn Thr Ser Met Lys Ala Leu Leu Ala	
210 215 220 225	
aag ctg aaa tcg gaa acc ttt att ctc gat ctc gca ccg aaa agc ccg	4797
Lys Leu Lys Ser Glu Thr Phe Ile Leu Asp Leu Ala Pro Lys Ser Pro	
230 235 240	
tta ccg aag ctc gat ggc tat cag tat cga ctg gtc gat acc gcg acg	4845
Leu Pro Lys Leu Asp Gly Tyr Gln Tyr Arg Leu Val Asp Thr Ala Thr	
245 250 255	
ctg gaa gtt gaa gtg ctg cgt gag cag ggg atc aac agc gta ttt acg	4893
Leu Glu Val Glu Val Leu Arg Glu Gln Gly Ile Asn Ser Val Phe Thr	
260 265 270	
cag tta agt gag cag ggc att cag gta tta agt atg cgt aac aaa gct	4941
Gln Leu Ser Glu Gln Gly Ile Gln Val Leu Ser Met Arg Asn Lys Ala	
275 280 285	
aac cgt ctg gaa gag ctg ttt gtt tca ctg gtt aat gaa aaa caa gga	4989
Asn Arg Leu Glu Glu Leu Phe Val Ser Leu Val Asn Glu Lys Gln Gly	
290 295 300 305	
gat cgc gca tga tgcattcttta ctgggtggcg ctaaaaagca tctgggcgaa	5041

100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300

Asp Arg Ala

agagatccat cgctttatgc gtatctgggt gcagacgctg gtgccgccag tcatcaccat 5101
 gaccctttac tttattatct tcggtaacct gattgggttcg cgtattggcg atatgcatgg 5161
 cttcagctat atgcagttca tcgtaccggg gctgatcatg atgtcgggtga tcaccaatgc 5221
 ctacgccaac gttgogtcat ctttttttgg tgccaagttc cagcgtataa ttgaagagct 5281
 gctggttagcg ccggttcoga ctcacgtcat tattgccgga tatgtcggcg gtggcgtggc 5341
 gcgtggtctg tttgttggca ttctgggtgac ggcaatttca ctgttttttg tgccatttca 5401
 ggtgcattcg tgggtattcg ttgccttaac gctggtgctc acggcgggtgt tgttctccct 5461
 tgcgggtttg ctgaacggtg tgtttgccaa aacgttcgat gacatcagcc tggtgccaac 5521
 ctttgtgtta acgocactca cgtatttggg cggggtcttt tactcactga ctttgttgcc 5581
 gccgttctgg caagggctgt cgcacctgaa cccaatcggt tatatgatca gtggtttccg 5641
 ctacggcttc ctoggtatca atgatgttcc gctggtcact acctttggcg tactggtggt 5701
 ctttattgtg gogttttatt tgatctgttg gtcgctgac caacgtggac gtggtttgcy 5761
 tagctaaggc tatttctctt cctctggatt tgggggagag gagttttgac ggctatcacc 5821
 ctttatcaac aatggtcagg gtagactgat ttccggctaa ggaggaaggc gatgttaggt 5881
 tgggtaatta cctgtcacga tgaccgggcy caagagatac tggatgcgct ggagaaaaaa 5941
 catggggcac ttcttcagtg ccgggccgtg aatttctggc goggattaag ctctaatatg 6001
 ctacgccga tgatgtgcy tgctctgcat gaagcggact ctggtgaggg tgtcatcttc 6061
 ttaaccgata tagccggagc gccaccgtat cgcgtggctt cattattaag ccacaaacac 6121
 tcccgttgcy aagtgatttc tgggtgtcac ttaccgttaa ttgaacagat gatggcttgc 6181
 cgtgaaacca tgaccagttc agagtttcgc gagcgtattg tcgaactggg tgcgccggag 6241
 gtgagtagtc tttggcacca acaacaaaaa aatccgcctt tcgtctcaa acataatttg 6301
 tatgagtatt aaccgcgat tctgatggcy cttttgtac aataaaagcy ttgtttcacc 6361
 ctcggttatt ttttcatgta caaacaagct gttattctcc tgctgatgct gtttaccgca 6421
 agtgtcagtg ccgogttacc tgcccgttat atgcaaacca tcgaaaatgc tgcggtctgg 6481
 gcgcaaattg gtgacaagat ggtgaccgtg gggaaatattc gggccggaca aatcattgcc 6541
 gtggagccca ctgccgaag ttattacgca tttaattttg gctttggcaa aggtttttatc 6601
 gataaaggtc atctcgagcc ggttcagggg cgacaaaaag ttgaagacgy tttgggcyac 6661
 ctcaacaagc cgctgagtaa tcagaactta gttacctgga aagatacgcc ggtctataac 6721

agcgttctgg caagggctgt cgcacctgaa cccaatcggt tatatgatca gtggtttccg 5641
 ctacggcttc ctoggtatca atgatgttcc gctggtcact acctttggcg tactggtggt 5701
 ctttattgtg gogttttatt tgatctgttg gtcgctgac caacgtggac gtggtttgcy 5761
 tagctaaggc tatttctctt cctctggatt tgggggagag gagttttgac ggctatcacc 5821
 ctttatcaac aatggtcagg gtagactgat ttccggctaa ggaggaaggc gatgttaggt 5881
 tgggtaatta cctgtcacga tgaccgggcy caagagatac tggatgcgct ggagaaaaaa 5941
 catggggcac ttcttcagtg ccgggccgtg aatttctggc goggattaag ctctaatatg 6001
 ctacgccga tgatgtgcy tgctctgcat gaagcggact ctggtgaggg tgtcatcttc 6061
 ttaaccgata tagccggagc gccaccgtat cgcgtggctt cattattaag ccacaaacac 6121
 tcccgttgcy aagtgatttc tgggtgtcac ttaccgttaa ttgaacagat gatggcttgc 6181
 cgtgaaacca tgaccagttc agagtttcgc gagcgtattg tcgaactggg tgcgccggag 6241
 gtgagtagtc tttggcacca acaacaaaaa aatccgcctt tcgtctcaa acataatttg 6301
 tatgagtatt aaccgcgat tctgatggcy cttttgtac aataaaagcy ttgtttcacc 6361
 ctcggttatt ttttcatgta caaacaagct gttattctcc tgctgatgct gtttaccgca 6421
 agtgtcagtg ccgogttacc tgcccgttat atgcaaacca tcgaaaatgc tgcggtctgg 6481
 gcgcaaattg gtgacaagat ggtgaccgtg gggaaatattc gggccggaca aatcattgcc 6541
 gtggagccca ctgccgaag ttattacgca tttaattttg gctttggcaa aggtttttatc 6601
 gataaaggtc atctcgagcc ggttcagggg cgacaaaaag ttgaagacgy tttgggcyac 6661
 ctcaacaagc cgctgagtaa tcagaactta gttacctgga aagatacgcc ggtctataac 6721

gcgccgagtg cggaagtgc gccatttggg gtactggcgg acaatttgcg ctacccgatt 6781
 ttgcataaac tgaaagacag gttaaataca acctgggtatc agatccgtat tggcgatcga 6841
 ctggcctata tcagcgcaact ggatgcccaa cccgataatg gcctgtcggg gctaacctat 6901
 caccatattc tgcgcgaaga agaaaacacc cgttttcgcc ataacttcgac gaccacatcg 6961
 gtacgcgctt tcaataacca gatggcctgg ctgcgtgaca ggggatacgc gacactgagc 7021
 atgggtgcagc tggaaggcta cgtgaagaat aagatcaatc tccctgcgcg agcgggtggg 7081
 attacctttg atgatggcct caagtcgggtg agccgctatg cgtatcctgt gttgaaacaa 7141
 tatggcatga aggcgacggc gtttattgtt acctcacgca tcaaacgtca cccgcagaag 7201
 tggaacccaa aatcgcgtgca atttatgagc gtttctgagc ttaacgaaat tcgcgatgta 7261
 tttgatttcc agtcacatac ccattttttg catcgggtag atggttatcg ccgaccata 7321
 ttactgagcc gtagtgagca caatattctg tttgattttg cacgttcacg ccgcgctctg 7381
 gcgcaattta atcgcgatgt ctggatatctt tcgtatccgt ttggcggatt taatgacaac 7441
 gccgtgaagg cagcaaacga tgccggattt cacctggcgg tgacaaccat gaaaggcaaa 7501
 gtaaaaccgg gggataatcc gttgttacta aaacgacttt atatcttaag aacggattcg 7561
 ctggagacga tgtcgcggct ggtgagtaac cagccgcagg gataacaatc aagcaacctg 7621
 taccggaatc gctttcgcgg tacgtttcat ttcattgtcg ccttcaaaat aggcgacgtt 7681
 gggtcgccag gtgcgagctt cttcatctgg catggtaacg aagctggcga tgatgacaat 7741
 atcgccgaca ctggcgcagt gggccgcgcg accgttaaca gaaataattc tcgaaccgcg 7801
 ttctgccgcg atggcataag tggagaaaacg cttgccgttg gtgacattcc agatatcaat 7861
 ggcttcgttt tcgagaatac cggctgcgtc aagaaaatcc tgggtcaatgg cgcaagaacc 7921
 ttcatagtgc aggtccgat gagtcacttt cagcgggtgg agtttgccct gcagcatcgt 7981
 gcgaatcata acttctacct ttctacctg tcgttaacga agcaggcgat gcctgctttg 8041
 aggaaattct cagcgatgat tgcccgttt ttgtttagtg tctactcatc tgacggcatt 8101
 tgcgtcagca gtttgcgtag cgcgccgaag cgtgccatgt atcgccgtga acgaattgat 8161
 atttctctga acgctgctcg gtaacaata aagagggtggc tgacgatagc gcgccttgac 8221
 tggatactgc cttcacgcaa agccacacgg aagacaggga agatggatgc accgagtacc 8281
 acaccgcatg acgcggtatt taaacaattt ttaatgcatg cggagacggc tcgcgacttt 8341
 ctggagatac atttgccagt ggaattacgc gaactttgtg acctcaacac gcttcattta 8401

8401
 gcttcattta
 acctcaacac
 gaactttgtg
 ggaattacgc
 atttgccagt
 ctggagatac
 8341
 tcgcgacttt
 cggagacggc
 ttaatgcatg
 taaacaattt
 acgcggtatt
 acaccgcatg
 8281
 accgagtacc
 agatggatgc
 aagacaggga
 agccacacgg
 cttcacgcaa
 ctgatactgc
 8221
 gcgccttgac
 tgacgatagc
 tgaagggtggc
 gtaacaata
 acgctgctcg
 atttctctga
 8161
 acgaattgat
 atcgccgtga
 cgtgccatgt
 cgcgccgaag
 gtttgcgtag
 tgcgtcagca
 8101
 tgacggcatt
 tctactcatc
 ttgtttagtg
 tgcccgttt
 cagcgatgat
 cagcgattct
 aggaaattct
 gcgaatcata
 8041
 gcctgctttg
 agcaggcgat
 tcgttaacga
 ttctacctg
 acttctacct
 7981
 gcagcatcgt
 agtttgccct
 cagcgggtgg
 gagtcacttt
 aggtccgat
 ttcatagtgc
 7921
 cgcaagaacc
 tgggtcaatgg
 aagaaaatcc
 cggctgcgtc
 tcgagaatac
 ggcttcgttt
 7861
 agatatcaat
 gtgacattcc
 cttgccgttg
 cttgccgttg
 tggagaaaacg
 atggcataag
 ttctgccgcg
 7801
 tcgaaccgcg
 gaaataattc
 accgttaaca
 gggccgcgcg
 ctggcgcagt
 atcgccgaca
 7741
 tgatgacaat
 aagctggcga
 catggtaacg
 cttcatctgg
 gtgcgagctt
 ggttcgccag
 7681
 aggcgacgtt
 ccttcaaaat
 ttcattgtcg
 tacgtttcat
 tgcgtcggg
 gctttcgcgg
 taccggaatc
 7621
 aagcaacctg
 gataacaatc
 cagccgcagg
 ggtgagtaac
 tgtcgcggct
 ctggagacga
 7561
 aacggattcg
 atatcttaag
 aaacgacttt
 gttgttacta
 gggataatcc
 gtaaaaccgg
 7501
 gaaaggcaaa
 tgacaaccat
 tgccggattt
 cagcaaacga
 gccgtgaagg
 gcgcaattta
 7441
 taatgacaac
 ttggcggatt
 tcgtatccgt
 ctggatatctt
 atcgcgatgt
 gcgcaattta
 7381
 ccgcgctctg
 cacgttcacg
 tttgattttg
 caatattctg
 gtagtgagca
 ttactgagcc
 7321
 ccgaccata
 atggttatcg
 catcgggtag
 ccattttttg
 agtcacatac
 tttgatttcc
 7261
 tcgcgatgta
 ttaacgaaat
 gtttctgagc
 atttatgagc
 aatcgcgtgca
 tggaacccaa
 7201
 cccgcagaag
 tcaaacgtca
 acctcacgca
 gtttattgtt
 aggcgacggc
 tatggcatga
 7141
 gttgaaacaa
 cgtatcctgt
 agccgctatg
 caagtcgggtg
 atgatggcct
 attacctttg
 7081
 agcgggtggg
 tccctgcgcg
 aagatcaatc
 cgtgaagaat
 tggaaggcta
 atgggtgcagc
 7021
 gacactgagc
 ggggatacgc
 ctgcgtgaca
 ctggcctgg
 gatggcctgg
 tcaataacca
 gtacgcgctt
 6961
 gaccacatcg
 ataacttcgac
 cgttttcgcc
 agaaaacacc
 tgcgcgaaga
 caccatattc
 6901
 gctaacctat
 gcctgtcggg
 cccgataatg
 gccatgcccaa
 ggatgcccaa
 tcagcgcaact
 ctggcctata
 6841
 tggcgatcga
 agatccgtat
 acctgggtatc
 gttaaataca
 tgaaagacag
 ttgcataaac
 6781
 ctacccgatt
 acaatttgcg
 gtactggcgg
 gccatttggg
 cggaagtgc
 gcgccgagtg

gagtcgggga gtttcattga agagagcctg aaaggacaca gcacggacgt gctctattcc 8461
 gtgcaaagtc agggcaatcc cgggttatctg catgttgatga ttgaacacca aagcaagccg 8521
 gataagaaaa tggcctttcg catgatgcgt tattctatag ccgccatgca ccggcatctg 8581
 gaggctgacc acgataagct gccgctggtg gtgccgatac tgttttatca gggcgaggcc 8641
 acaccttata cgctatcaat gtgctggttt gatatgtttt actcgccgga gctggcgcca 8701
 cgcgtctata acagtccttt ccgctggtg gatatcacca tcacaccgga tgacgaaatc 8761
 atgcaacatc ggcggaattg gattctcgaa ctactgcaaa aacatattcg ccagcgcgac 8821
 ttaatgttat tgcttgagca actggtcacg ctgatcgacg aagggtacac tagcggaagt 8881
 cagttagttg ccatgcaaaa ctatatgctg caacgcggtc atactgaaca agcggatttg 8941
 ttttacggtg tgttgagaga cagggaaacg ggaggggagt ctatgatgac gctggcgccg 9001
 tgggttgaaag agaaaggat tgagaagggg attcagcagg gaagacagga agtaagtcag 9061
 gaattcgccc agcgtcttct gagtaaagga atgtctcggg aagacgttgc agagatggca 9121
 aatttacctc ttgctgagat tgataaggta attaacctta ttttaagttac ctgtgttatg 9181
 acagatgacg tggggtaaat taataactgg cgccatcagc cgtagcgcca gttaagtatt 9241
 acgccagctc gaccatcttg ttgtcgatca ggcgagcatc gccaaagccag gcggctacca 9301
 gaattactgc ccgtttgctg gtttcagaaa cttccagcaa tgtgtcggca tcgcgaatct 9361
 gaatatcatc ggcgcggaag cttttttcat tcagttcttg ccccgaatg gtaataattt 9421
 catcgagatc ccgttcccc gcttgcaatt tgcagcaat cgaacttaaa actttgtaca 9481
 gaccaggcgc aattttgcgt tgttcgcgcg tcagataacc gttacgggaa cttagcgcca 9541
 gaccgtcttt ggcgcgcata attggcacac cgacaatctc aatatcgaag cccatatcgg 9601
 caaccatctt gcggtcagc gccagttgct gaaaatcttt ttcaccgaag caggcgatgt 9661
 ccggctggac caggttgaac agcttgctga caatagtcga aacgcgcgca aaatgtccc 9721
 gacggctggc accttcagc atggtcgaaa ggccaggaa gtcaacgtaa gtgtgggttt 9781
 cagtaccgtt cgggtagatc ttttttaccg aagggcgcaa aactaaatcc actttacgtt 9841
 tgtttagctt ctgcagtc tcttgcaagg tccgtggata acgagccaga tcttcgggc 9901
 ggtcgaactg catcgggtta acgaaaatac tgacgacgac cacatcggcg cgggctttgg 9961
 cttcgtcgac cagcttcata tggccatcgt gcaggttacc catggtaggc accagcgcca 10021
 cgcgcttgcc ttccatacgc aggcggcgaa tttgctgacg cagcagcggc agggtttcga 10081
 taattaacac aacgtgactc cttaatggaa actgtgttct tcgcccgat aaacgccgga 10141

ctccacttca gccatataact gccgcacagc cgcgcggatg tcgcccgttt cggcgaggaa 10201
 attttttagcg aatttaggaa tgtgaccgcc ggtaatacca aaggcgctcg gcatcacgag 10261
 gatctgcccc tcagtgaagt tgcctgcgcc aatgccaata accgggatcg ccagtgttc 10321
 ggtaatacgt tttgccagtt caaccggcac gcattccagc accagcagct gtgccccagc 10381
 agcttctaag gctaatacat cgctgagcag ttgatcgccc gcttcacgc cgcgcccctg 10441
 aactttgtag ccaccgaaaa tattcactga ctgtggtgtt aaacctaat gaccacatac 10501
 aggaacggca cgttcggtca gcatttgtac ggtttctacc agccactcac cgccttcaat 10561
 tttgaccatg ttagcacagg cagcacaac cgttcggcg ttttcgaagg cttgttccgg 10621
 cgtggcatac gccataaacg gcaggtcagc cagcagcagg cagtttgggtg cgcgcgacg 10681
 tacggcggca gtgtggtagg cgatatcggc aacggtaact ggcaggggtg agtcgtgccc 10741
 ctgaaccgtc atgccagcg aatcgccac cagcatgacg ttaagccctt catcagcaaa 10801
 gagtttggcg aagctatagt cataagcggg gatggtcgcg aaacgtttt tttcctgttt 10861
 gtactttctgc agtaaggaga tgggtggtcgg tttcataacg taccctgata aattgatgtt 10921
 gtgctgtctg gcattttatc agtcacattg gtgggggcaa tgatttatcc gtagcagcac 10981
 t 10982

<210> 69
 <211> 308
 <212> PRT
 <213> Escherichia coli

<400> 69
 Met Thr Ile Ala Leu Glu Leu Gln Gln Leu Lys Lys Thr Tyr Pro Gly
 1 5 10 15
 Gly Val Gln Ala Leu Arg Gly Ile Asp Leu Gln Val Glu Ala Gly Asp
 20 25 30
 Phe Tyr Ala Leu Leu Gly Pro Asn Gly Ala Gly Lys Ser Thr Thr Ile
 35 40 45
 Gly Ile Ile Ser Ser Leu Val Asn Lys Thr Ser Gly Arg Val Ser Val
 50 55 60
 Phe Gly Tyr Asp Leu Glu Lys Asp Val Val Asn Ala Lys Arg Gln Leu
 65 70 75 80
 Gly Leu Val Pro Gln Glu Phe Asn Phe Asn Pro Phe Glu Thr Val Gln
 85 90 95
 Gln Ile Val Val Asn Gln Ala Gly Tyr Tyr Gly Val Glu Arg Lys Glu

100	105	110
Ala Tyr Ile Arg Ser Glu Lys Tyr Leu Lys Gln Leu Asp Leu Trp Gly		
115	120	125
Lys Arg Asn Glu Arg Ala Arg Met Leu Ser Gly Gly Met Lys Arg Arg		
130	135	140
Leu Met Ile Ala Arg Ala Leu Met His Glu Pro Lys Leu Leu Ile Leu		
145	150	155
Asp Glu Pro Thr Ala Gly Val Asp Ile Glu Leu Arg Arg Ser Met Trp		
165	170	175
Gly Phe Leu Lys Asp Leu Asn Asp Lys Gly Thr Thr Ile Ile Leu Thr		
180	185	190
Thr His Tyr Leu Glu Glu Ala Glu Met Leu Cys Arg Asn Ile Gly Ile		
195	200	205
Ile Gln His Gly Glu Leu Val Glu Asn Thr Ser Met Lys Ala Leu Leu		
210	215	220
Ala Lys Leu Lys Ser Glu Thr Phe Ile Leu Asp Leu Ala Pro Lys Ser		
225	230	235
Pro Leu Pro Lys Leu Asp Gly Tyr Gln Tyr Arg Leu Val Asp Thr Ala		
245	250	255
Thr Leu Glu Val Glu Val Leu Arg Glu Gln Gly Ile Asn Ser Val Phe		
260	265	270
Thr Gln Leu Ser Glu Gln Gly Ile Gln Val Leu Ser Met Arg Asn Lys		
275	280	285
Ala Asn Arg Leu Glu Glu Leu Phe Val Ser Leu Val Asn Glu Lys Gln		
290	295	300
Gly Asp Arg Ala		
305		

<210> 70

<211> 256

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 4998-5768 of seq id 68

<400> 70

Met Met His Leu Tyr Trp Val Ala Leu Lys Ser Ile Trp Ala Lys Glu
1 5 10 15

Ile His Arg Phe Met Arg Ile Trp Val Gln Thr Leu Val Pro Pro Val
20 25 30

```

Ile Thr Met Thr Leu Tyr Phe Ile Ile Phe Gly Asn Leu Ile Gly Ser
    35                                40                                45

Arg Ile Gly Asp Met His Gly Phe Ser Tyr Met Gln Phe Ile Val Pro
    50                                55                                60

Gly Leu Ile Met Met Ser Val Ile Thr Asn Ala Tyr Ala Asn Val Ala
    65                                70                                75                                80

Ser Ser Phe Phe Gly Ala Lys Phe Gln Arg Asn Ile Glu Glu Leu Leu
    85                                90                                95

Val Ala Pro Val Pro Thr His Val Ile Ile Ala Gly Tyr Val Gly Gly
    100                                105                                110

Gly Val Ala Arg Gly Leu Phe Val Gly Ile Leu Val Thr Ala Ile Ser
    115                                120                                125

Leu Phe Phe Val Pro Phe Gln Val His Ser Trp Val Phe Val Ala Leu
    130                                135                                140

Thr Leu Val Leu Thr Ala Val Leu Phe Ser Leu Ala Gly Leu Leu Asn
    145                                150                                155                                160

Gly Val Phe Ala Lys Thr Phe Asp Asp Ile Ser Leu Val Pro Thr Phe
    165                                170                                175

Val Leu Thr Pro Leu Thr Tyr Leu Gly Gly Val Phe Tyr Ser Leu Thr
    180                                185                                190

Leu Leu Pro Pro Phe Trp Gln Gly Leu Ser His Leu Asn Pro Ile Val
    195                                200                                205

Tyr Met Ile Ser Gly Phe Arg Tyr Gly Phe Leu Gly Ile Asn Asp Val
    210                                215                                220

Pro Leu Val Thr Thr Phe Gly Val Leu Val Val Phe Ile Val Ala Phe
    225                                230                                235                                240

Tyr Leu Ile Cys Trp Ser Leu Ile Gln Arg Gly Arg Gly Leu Arg Ser
    245                                250                                255

```

<210> 71

<211> 11756

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (2897)..(3184)

<400> 71

atgggctcca caaaatgggg acatcaaaga aaagcagtgg cactaattaa gactgatgcc 60

ctgcggaaaaa gttctgcggt tgtgcaaaaa aatttcattt tcagggcaac ttcagtttta 120
 tcctaatacct ggccatacca tgacgatgat tgtccctgcc agcgtcagca ggacgttggc 180
 gattgcatag gtgccgcgat agccagcgc cgggatgtta ctgcgagctg tatcactgat 240
 gatctccatt gcgggcgcgc aggtacgtgc gcccatcatt gcgccgaaca acagcgcgcg 300
 gttcattcgc aatacataag caccgaacaa gaaacagata accacgggca ccagactgac 360
 aatcaatccg gcaatcaaca tctgaccgcc aatcgcgcgc aggcggttat taataccgct 420
 accggcgcctc agaccaacgc ctgccataaa caccatcaag ccgaactctt tcaccatgct 480
 taatgcaccc tgcggaatgt aaccgaaggt cgggtgggta gcacgcataa agcccagcat 540
 aattccggcg aataacaacc cggcagcgtt ccccatgccg aaactgaatg tgctgaactg 600
 gaaggtgatc atcccgatca tcagcccaat aacaaagaag gcgcagaatg ccagcaggtc 660
 agtgacctgg ctgtgaatcg agataaagcc gatgcgatcg gcgatggttt ttacgcggcg 720
 ggcatcgccg ctgacttgta aaacgtcacc tttgttaagc acgacgttgt catctatcgg 780
 catctcaatc tggctacgaa tgacgcggtt aaggaagcaa ccgtgatcgg tcaacttcag 840
 ttgtgcgaga cgtttaccta cagcgttatg gtttttaacg accacttctt cagtgcagat 900
 acgcagtgcg agaaggtcac gatcgaaaac ttctttaccg ttacggaagc tgggatcgag 960
 tcgggcatgg gcgtcgggat agcctaccaa cgctatttca tcgccattt gtagcacggc 1020
 atcaccgtct ggatttgcca gaatcccggt acgtcgaata cgttcaatgt agcagccggt 1080
 ttgtcgataa ataccagtt cagcagatt tttgccgtcg gtccaggcca ccagttccgg 1140
 gccgacgcga taggcgcgga tcaccggtaa ataaacctta cgtttggcat cagtgtccag 1200
 gccacgttcg cgggcgattt gctgggcgct ggtctgtaag tcctgatgct gcaatttcgg 1260
 caagtaacgc gcaccaacaa tcaaaactcac cagaccgatt aaatagggtta aggcataccc 1320
 gaggtcaga ttatccagtg ccagtgcagc ctgcctgctt tccatgccg aatgacgcag 1380
 tgtatcgcca gcaccgacca gaaccggtgt cgacgtcata gagcctgcta acataccggc 1440
 cgtcaggcca atatccagc caaacagctt acctaaccct aaggcgatca ccagcgcact 1500
 gccaaccatc accagtgcga acattaggta atttttccca tcgcgaaaaa aatggaaaa 1560
 aaagtccggt ccggcttcga cccgcgcga gaaaataaac agcataaagc caagattaag 1620
 cgcacgggtg ttaatgctga aatgttggtg gcctaataac agcgatacga ctaaacgcc 1680
 aatggaatta ccagttgga tcgaaccaag tcgtaacttt ccgagacata gcccaagcgc 1740

120 180 240 300 360 420 480 540 600 660 720 780 840 900 960 1020 1080 1140 1200 1260 1320 1380 1440 1500 1560 1620 1680 1740

gaggaccaca aataataaca gaatgtaatt cccatttaac aattcggcga cgtttatatt 1800
 cacggaggct aacttcttgt ttactagtaa gctgttgaaa gaaatggtaa ttacgataa 1860
 tgttttttac cagaattcag ggccagatt cattcagcgc acctaaacga tagtaaagta 1920
 acaatatatt ttactagtgt aatcacatta ggtatcaacg gctatatgaa ttgcgttggc 1980
 ctatattagc atggaatgcg aagcggcttt atcttactga acgccacaact ggcgaaaaat 2040
 gtgttcgata gacgcagtgt caggaggaac gagtgaaaca taaacaacgt tgggcggggg 2100
 caatctgctg tttgtctc ttcattgtgg tgtgcctttt tctggcgacg cacatgaaag 2160
 gcgcttttcg ggctgccggg catcctgaaa tcggcttgct atttttcatt cttcctggag 2220
 cagtcgccag cttcttttca cagcgtagag aagtcctgaa acctctgttt ggcgcaatgc 2280
 tggcggcacc ctgttcgatg ctcatatgc ggctgttttt ttcaccgaac cgctcattct 2340
 ggcaagagct ggcatggtta ctaagcgcgg tgttctgggtg tgcgctgggg gcaactgtgtt 2400
 tcttatttat cagtagtttg tttaaaccac agcacagaaa aaatcagtaa agccctcaac 2460
 gcgagggctt gtcagacgat caggcgtcca gattttcttt caccatgca gcaaaatcgg 2520
 tatagccgcc gatatgttc tgatcgacaa aaatctgcgg cagggtttct acgggtttac 2580
 ctgccttttg ctgtagatct tctttagtga tcccttcgc acgaatatct acatactgat 2640
 actgaaaatc atcgcgttca ttgtcaatt tctcagccag atcttttgca cgcacacagt 2700
 aagggaacc cgaacgacca aaaataacgg ttgcattat ttctctctc atagatttat 2760
 gcctgtaatg atcacgctaa aatgtattcg ctgaaagtag gtttaacctg ttgcattaat 2820
 tgctaaaagc tataactgtt aaacacaata cagtgaaaag ttttagactg aaggctcact 2880
 ttgcagaggg aagcgt atg cgc gcg atc ggt aaa ttg cct aaa ggc gtg ttg 2932
 Met Arg Ala Ile Gly Lys Leu Pro Lys Gly Val Leu
 1 5 10
 ata ctg gaa ttt atc gga atg atg cta ctg gcg gtg gcg ctg ctg tgc 2980
 Ile Leu Glu Phe Ile Gly Met Met Leu Leu Ala Val Ala Leu Leu Ser
 15 20 25
 gta agc gac tcc ctg tgc ctg cct gag cca ttt tct cgg cca gaa gtg 3028
 Val Ser Asp Ser Leu Ser Leu Pro Glu Pro Phe Ser Arg Pro Glu Val
 30 35 40
 cag att ctg atg att ttt ctc ggt gtt ttg ctc atg ctt ccc gct gcg 3076
 Gln Ile Leu Met Ile Phe Leu Gly Val Leu Leu Met Leu Pro Ala Ala
 45 50 55 60
 gtg gtg gtt att ctt cag gtg gca aaa cgt ctt gcc cca cag ctg atg 3124
 Val Val Val Ile Leu Gln Val Ala Lys Arg Leu Ala Pro Gln Leu Met
 65 70 75

gcc aac cat tga acttatttgt ggccatcgct ccattcgcca ttctactgat 3224
Ala Asn His
95

gaacccattt	ccgaagcgca	gcgtgaggcg	attattaaca	gcgcccgtc	gacgtccagt	3284
tccagttttt	tgcagtgcag	tagcattatt	cgcattaccg	acaaagcggt	acgtgaagaa	3344
ctggtgacgc	tgaccggcgg	gcaaaaacac	gtagcgcaag	cggcggagtt	ctgggtgttc	3404
tgtgccgact	ttaaccgcc	tttacagatc	tgtccggatg	ctcagctcgg	cctggcggaa	3464
caactgttgc	tcggtgtcgt	tgatacggca	atgatggcgc	agaatgcatt	aatcgcagcg	3524
gaatcgctgg	gattgggcgg	ggtatatatc	ggcggcctgc	gcaataatat	tgaagcggtg	3584
acgaaactgc	ttaaattacc	gcagcatgtt	ctgccgctgt	ttgggctgtg	ccttggctgg	3644
cctgcggata	atccggatct	taagccgcgt	ttaccggcct	ccattttggt	gcatgaaaac	3704
agctatcaac	cgttgataa	aggcgcaactg	gcgcagtatg	acgagcaact	ggcggaaatat	3764
tacctcacc	gtggcagcaa	taatcgccgg	gatacctgga	gcgatcatat	ccgccgaaca	3824
atcattaaag	aaagccgccc	atttattctg	gattatttgc	acaaacaggg	ttgggcgacg	3884
cgctaaaacc	gccacgtcga	tgtatgatac	gcgggctttt	gaccaggctc	gacagagagg	3944
tgcagggtga	aaattgccat	attgtcccgg	gatggaacgc	tctattcgtg	taagcggctg	4004
cgtgaagccg	ctatacagcg	cggtcacctg	gttgaaattc	ttgatccgct	ttcttgctac	4064
atgaacataa	atcctgcggc	gtcttctatt	cactacaaag	gccgcaagtt	acccattttt	4124
gacgcagtga	tcccgcgat	tggcacccgc	attacctttt	atgggacggc	ggcactgcgc	4184
cagttcgaga	tgttggggag	ctatccgctc	aatgagtcgg	tcgccattgc	ccgggcgcgt	4244
gacaaattgc	gttccatgca	actgctggcg	cgtcagggca	tcgacctgcc	tgtcacgggc	4304
attgcgcatt	cgcgggatga	taccagcgat	ttaatcgaca	tggtcgggtg	tgcgcgcgtg	4364
gtggtcaagt	tggttgaagg	cacgcaggga	attggcgctc	tgctggcgga	gacgcgtcag	4424
gcggcgaaaa	gcgtgattga	cgctttccgc	ggtctgaacg	cgcatattct	ggtgcaggaa	4484
tatatcaaag	aggcgcaagg	gtgcgatatc	cgctgtctgg	ttgttggcga	tgaagtggtc	4544
gctgcgattg	aacggcgggc	gaaagagggc	gattttcgtt	ccaatttgca	tcgtggcggc	4604
gcggcaagcg	tcgccagtat	cacaccacag	gagcgtqaaa	tcgcgataaa	agccgcgcga	4664

agctgtgtgg tgctgacggt ttaaggagca aagatgagta cacttgaacc tgctgcccag 8144
 tcgaaaccgc cgggcggatt taagctgtgg ttgtcgcagc tgcaaatgaa gcatgggccc 8204
 aaactgggtca ttgcgttgcc atatatctgg ttgatcttgc tgtttctgct gccatttctg 8264
 attgtcttta aaataagcct ggcggagatg gcgcgcgcta ttccacctta taccgaactg 8324
 atggagtggg ctgacgggca actgtccatc actcttaatc tcgtaattt tctgcaactg 8384
 accgacgac cgtctatatt cgatgcttat ctccagtcgc tacagggtggc tgcgatttctg 8444
 acattttgct gtttactgat cggctatccg ctggcgtggg cgggtggcga cagtaagcct 8504
 tcgaccgta atattttatt actactgggtg atcctgccgt cgtggacctc gtttctgac 8564
 cgcgtttatg cctggatggg aatattaaaa aacaacgggt tgctgaataa ttttctgctg 8624
 tggctggggg ttatcgatca accgctgacc attctgcata ccaatctggc cgtttatatc 8684
 ggcattgttt acgcttacgt gccgtttatg gtactgccga tttataccgc gttgattcgt 8744
 attgattatt cgtggtgga agcagcgtg gatctcgtg cagaccgct gaaaacgttc 8804
 tttactgtga tcgtgccgt gactaaagggt gggattattg ccgatcgat gctggtgttt 8864
 atcccggtg tgggcgagtt tgtgatcccg gaactgctcg gtggcccgga cagcatcatg 8924
 atcgggcgcg tgctatggca agagtttttc aataaccgcg actggccggt ggcctcggcg 8984
 gtagcgatca tcatgttct gctgctaatt gtgccgataa tgtggttcca caaacaccag 9044
 caaaaaagcg tgggagaaca cggatgaata atttaccggt agttcgttcg ccctggcgga 9104
 ttgtgatttt gctgctgggc tttaccttc tctacgcgc aatgctgatg ctggttatct 9164
 attcgtttta cagctcgaag ctggtgacgg tgtgggcccg ctggtcaacg cgtggtatg 9224
 gtgagttatt gcgcgatgac gcgatgatga gtgcggttgg tttaagtctg acaattgcgg 9284
 cctgtgcggc gacggcggcg gcgactctcg gaactattgc ggcggtggtg ctggtgcgct 9344
 ttggcaggtt tcgcggatca aatggctttg cctttatgat caccgcgccg ctggtaatgc 9404
 cagatgtcat cacgggcttg tcgctgttgt tattattcgt cgcgcttct catgccattg 9464
 gctggcctgc ggaccgcggt atgctacca tctggctggc gcatgtcact ttttgtacgg 9524
 ctatgtggc ggtcgttatt tcttcaagat tcggggaact ggatcgctcg atagaagaag 9584
 cagcgatgga tctcgggtgc acgccgctga aagtgtttt cgtcattacg ctaccgatga 9644
 tcatgccgc gatcatttct ggtggttac tggcttttac tttgtcgtt gatgatctgg 9704
 tgatgccag ctttgtttcc gggccgggag ccaccacgtt accgatgctg gtcttttcca 9764
 gcgtgcggat gggggtgaat ccggaaatca acgcctggc aacattgatc ctgcgcgcg 9824

agctgtgtgg tgctgacggt ttaaggagca aagatgagta cacttgaacc tgctgcccag 8144
 tcgaaaccgc cgggcggatt taagctgtgg ttgtcgcagc tgcaaatgaa gcatgggccc 8204
 aaactgggtca ttgcgttgcc atatatctgg ttgatcttgc tgtttctgct gccatttctg 8264
 attgtcttta aaataagcct ggcggagatg gcgcgcgcta ttccacctta taccgaactg 8324
 atggagtggg ctgacgggca actgtccatc actcttaatc tcgtaattt tctgcaactg 8384
 accgacgac cgtctatatt cgatgcttat ctccagtcgc tacagggtggc tgcgatttctg 8444
 acattttgct gtttactgat cggctatccg ctggcgtggg cgggtggcga cagtaagcct 8504
 tcgaccgta atattttatt actactgggtg atcctgccgt cgtggacctc gtttctgac 8564
 cgcgtttatg cctggatggg aatattaaaa aacaacgggt tgctgaataa ttttctgctg 8624
 tggctggggg ttatcgatca accgctgacc attctgcata ccaatctggc cgtttatatc 8684
 ggcattgttt acgcttacgt gccgtttatg gtactgccga tttataccgc gttgattcgt 8744
 attgattatt cgtggtgga agcagcgtg gatctcgtg cagaccgct gaaaacgttc 8804
 tttactgtga tcgtgccgt gactaaagggt gggattattg ccgatcgat gctggtgttt 8864
 atcccggtg tgggcgagtt tgtgatcccg gaactgctcg gtggcccgga cagcatcatg 8924
 atcgggcgcg tgctatggca agagtttttc aataaccgcg actggccggt ggcctcggcg 8984
 gtagcgatca tcatgttct gctgctaatt gtgccgataa tgtggttcca caaacaccag 9044
 caaaaaagcg tgggagaaca cggatgaata atttaccggt agttcgttcg ccctggcgga 9104
 ttgtgatttt gctgctgggc tttaccttc tctacgcgc aatgctgatg ctggttatct 9164
 attcgtttta cagctcgaag ctggtgacgg tgtgggcccg ctggtcaacg cgtggtatg 9224
 gtgagttatt gcgcgatgac gcgatgatga gtgcggttgg tttaagtctg acaattgcgg 9284
 cctgtgcggc gacggcggcg gcgactctcg gaactattgc ggcggtggtg ctggtgcgct 9344
 ttggcaggtt tcgcggatca aatggctttg cctttatgat caccgcgccg ctggtaatgc 9404
 cagatgtcat cacgggcttg tcgctgttgt tattattcgt cgcgcttct catgccattg 9464
 gctggcctgc ggaccgcggt atgctacca tctggctggc gcatgtcact ttttgtacgg 9524
 ctatgtggc ggtcgttatt tcttcaagat tcggggaact ggatcgctcg atagaagaag 9584
 cagcgatgga tctcgggtgc acgccgctga aagtgtttt cgtcattacg ctaccgatga 9644
 tcatgccgc gatcatttct ggtggttac tggcttttac tttgtcgtt gatgatctgg 9704
 tgatgccag ctttgtttcc gggccgggag ccaccacgtt accgatgctg gtcttttcca 9764
 gcgtgcggat gggggtgaat ccggaaatca acgcctggc aacattgatc ctgcgcgcg 9824

acgcccacaaac tatggcgaaa gatataccgcg aactgcctgg gtttcgtatt gaacgggtgc 11564
 agctttttcga tatgttcccg cataccgcgc actatgaagt gctgacgctg ctggtgaagc 11624
 aataaaaaaag ccgcatgtgc ggcttcagat tgctgacaaa gtgcgcgttg tttatgccgg 11684
 atgcggcgta aacgccttat ccggcctaca aaagcgtgca aattcaatac attgcatggg 11744
 ccatgtaggc ct 11756

<210> 72
 <211> 95
 <212> PRT
 <213> Escherichia coli

<400> 72
 Met Arg Ala Ile Gly Lys Leu Pro Lys Gly Val Leu Ile Leu Glu Phe
 1 5 10 15
 Ile Gly Met Met Leu Leu Ala Val Ala Leu Leu Ser Val Ser Asp Ser
 20 25 30
 Leu Ser Leu Pro Glu Pro Phe Ser Arg Pro Glu Val Gln Ile Leu Met
 35 40 45
 Ile Phe Leu Gly Val Leu Leu Met Leu Pro Ala Ala Val Val Val Ile
 50 55 60
 Leu Gln Val Ala Lys Arg Leu Ala Pro Gln Leu Met Asn Arg Pro Pro
 65 70 75 80
 Gln Tyr Ser Arg Ser Glu Arg Glu Lys Asp Asn Asp Ala Asn His
 85 90 95

<210> 73
 <211> 10144
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (9051)..(9305)

<400> 73
 aattataaca cagccgcgca gtttgaggta aacctatacg ctttattcac atccaatgcc 60
 tgatatactc gtttgtcttg ccaattacgg agtagaagtg ccaatgaatg ccgaaaaatc 120
 gccggtaaac cataacgtag accacgaaga gatcgctaaa tttgaagccg tcgcctcccg 180
 ctggtgggat ctggaagggt agttcaaacc gctgcaccgc attaaccgc tgcgctctggg 240
 ctatattgcc gagcgtgctg gcgggtttatt tggcaaaaag gtgctcgatg tcggttggtg 300
 cggcggcatt ctggccgaga gtatggcgcg cgaaggcgcg acggtgaccg gtctggatat 360

agactgaact gcgcattggt ttgaaactgc gtgggatcag ctgcgaaatc aaccacttta 2100
 atgcctgtcg atgtcggctc accaatccct gtaatggagt taaccaccac agttgtgttg 2160
 ccagcagtat taccgttcat caccaattga tcgcttaccg agtcacgcgc gtttaattcg 2220
 ctatcgagca gtagcgtacc gcgcgcggtg taatcacctg ttaccgtcag cgtatcgcca 2280
 gcgacgccat tttgcaggct aacgcaccg gacgtattgg tcagattgcc attaacctgc 2340
 acgttggaag gataagtcag gctgtcagtt tcaagggttg tattaagctc acctgtcaac 2400
 gtcacaccat cgggtggcatt caccagcgtc ccatcgccgt taaatagtga ggcattaagg 2460
 gcgacggaag tatcctgccc gggtcaggcgc aaaaccgtac catcgtgat gtcgatagt 2520
 ccgctggaag tagcatcaat tgactgaata tcctgatccg cgccagtaac gaacgttgcc 2580
 ccatcaccaa cccacagtga cgaagcataa ggaaggatat cagcaacatc acctttcagg 2640
 gtgccttctt cgacacgtac cgccgactgc gttgtaccgc tggcggtcag ctccagtgtg 2700
 ccagcccccg ttttagtcaa tgtgtacccc tcctcctgat gctgcccgtc gctgtcagcc 2760
 atcagtgcgc cccactgcgt gtctaccccc gcatcaactg ccacttcacc gtcggcgcgc 2820
 atttcaatat cagtcctgtg gcctgcgcga tctgaacgcg tgtcaacgtc ggaggtaatc 2880
 tccatcacgc tttcttgttg cttatcggtg aagataacct ggcggttata gtgggtatct 2940
 ccaagctgcg agttgtcgtc caccatcagc gtaccggagg cgatttgtgt tgtgccccaa 3000
 taactattat tgtttgccag acttacctgc ccgtcgtcgc catcgaccac caagtagacy 3060
 ccatctttcc cgtcgcgcgc gatatgcaaa ttgtcgcac ctgcaagatc taccacatcc 3120
 tgactgccga taaccgttcc gctgctgcca ctgacttcaa ggccatcgtt gtatgatgtg 3180
 ccgctctgcc aggtggagaa atcagagaga tcgagcacac cgccgtttaa caogatcgac 3240
 tgccggtcgt cctggagagc ggtaagatct gccgcgtcgc cttccagcga aagcaccgca 3300
 ccatcatcaa cgactatctc gcgggttagc gccatcgact gcgcccctgc cagcacgtag 3360
 ctgccgtttt gcgcaatggt gagctgacca gcaccttcca tgatgccagc aaaactgccc 3420
 tgattaacag taacgttgcc accagcatcg atatttaaag tgccattctg aaagcccgtc 3480
 aatgcgtgca caaaagtgtg ttgggtcgag ccaacgttta gtcagcctg attctgatac 3540
 tgatcaatac tccctatcgt cagaccgtag cagtcttgcg gatcgtcctg gcaatgcgta 3600
 tcgcccacat tcatcaggga gttgctgcgg ccaggggtaa cttcacctgt ttcaatctgc 3660
 atctcaccag taaagtcatt gttatctgca ttaagtacca gatcgccgga acctgttttg 3720
 gtgattaacc cgttaccagc aatagagtca acagctccgt cattctctgt attgccaata 3780

accagcggtt ttccgtcggc aatatcaaag gtaacttcac ttaagccgag atacataaag 3840
 ccacccgcgc cagaggaagg accatctcca tagcctgctg cgctattggt ctcatcgact 3900
 aacacgcctc cgttctggct gtagctgtca tcaacagaaa tatcaataag atagggagcc 3960
 gtcacgctat tggatatata cgcgccgcca taaccttcgg cagtgttatt tgtaaaggca 4020
 gtgttattta ctatcgtata acctgaagga tgcttgctgt cgctattatt atcggtaaca 4080
 tcgattgcc cgccatcgcc atcaactgtaa cttgttgatg tatatgcctg gttgttatca 4140
 aaaataacat cacttaaata aacgtcatta ttaatggtat aaattgcgcc acctttgcc 4200
 tcattagcga tgttattgcg aaacatggcg ttagtgacac gtaaatcgac ggcaccagta 4260
 tcgttagtac cagaagaata gattgcgcca ccatagccgc ctgcgacgtt accggaaaaa 4320
 ataacatcag taagattcag cggtgagttt tcttagcaa atatggcccc gcggttatta 4380
 tattctctg taacggtggt attggcaaac agagtcattc cagtttcatt ttctggtaat 4440
 agtgaaaatt ccgctccttg ttgcaaaaat acggcccccac cgctggcggtt attggtcata 4500
 tccgaaaaaa ccagccattg cccatcagcg atactccagt cctgcgtaat gctgaaagg 4560
 ctttgccctgc tggcctgaca actcgcttg acatcatatc cctggcatga atcagtgacc 4620
 gccgcgacac cgtttagcaga gaaaagagat gcaatcattg acgggagtaa agataaatac 4680
 tccttgcgta gaaagataat ccgcatatta atctaaccat cattttctat aagacggcgt 4740
 atttaatcgc attatacgat atggaatata tttcttttgt aaattgttca acccggtgca 4800
 atggctatct tgttattatt tgatgaataa tatcagtgcg tcataattca agttaataac 4860
 cttcagggat atcagttata tttaaactaa attaaagtca tgaataattt tcttataata 4920
 taaggtaaata taacaaaatg gcttagcatt taacaataac cgaatagaaa acaaccattt 4980
 cgccatcaac aatctcttac attcgcttat atattgacca caactgatac atcagattat 5040
 gtgatgactc gtgcttagat caatttttgc aatcattagc aaaaagatta ataagccatc 5100
 tatatcaatt tatctaacct attatgcgtt tcaagaaatc gccgaacagt tatttttaac 5160
 aaatttttct ctteccattg actttccggg acaccttgct tgacctagg tgccgcaaag 5220
 ccactttttc ctctctgagt tatccacaaa gttatgcact tgcaagaggg tcattttcac 5280
 actatcttgc agtgaatccc aaacataccc cctatatata gtgttctaag cagcttcccg 5340
 tactacaggt agtctgcatg aaactattgc ggaaagaatt ccaaaaacag gtacgacata 5400
 catgaatcag aatctgctgg tgacaaagcg cgacggtagc acagagcgca tcaatctcga 5460

3840 3900 3960 4020 4080 4140 4200 4260 4320 4380 4440 4500 4560 4620 4680 4740 4800 4860 4920 4980 5040 5100 5160 5220 5280 5340 5400 5460

caaaatccat cgcgttctgg attgggcggc agaaggactg cataacgttt cgatttccca 5520
 ggtcgagctg cgctcccaca ttcagtttta tgacggatc aagacctctg acatccacga 5580
 aaccattatc aagggtgccg cagacctgat ctcccgatg gcgccggatt atcagtatct 5640
 cgccgcgcgc ctggcgatct tccacctgcg taaaaaagcc tacggccagt ttgagccgcc 5700
 tgcgctgtac gaccacgtgg tgaaaatggt cgagatgggc aaatacgata atcatctgct 5760
 ggaagactac acggaagaag agttcaagca gatggacacc tttatcgatc acgacctga 5820
 tatgaccttc tcttatgctg ccgttaagca gctggaaggc aaatatctgg tacagaaccg 5880
 cgtgaccggc gaaatctatg agagcgccca gttcctttat attctagttg ccgcgtgctt 5940
 gttctcgaac taccgcgctg aaacgcgcct gcaatatgtg aagcgttttt acgacgcggt 6000
 ttccacattt aaaatttcgc tgccgacgcc aatcatgtcc ggcgtgcgta ccccgactcg 6060
 tcagttcagc tctgctgac tgatcgagtg ccgtgacagc ctggattcca tcaacgccac 6120
 ctccagcgcg attgttaaat acgtttccca gcgtgccggg atcggcatca acgccggcg 6180
 tattcgtgcg ctgggtagcc cgattcgcg tggtgaagcg ttccataccg gctgcattcc 6240
 gttctacaaa catttccaga cagcggtgaa atcctgctct cagggcggtg tgcgcggcg 6300
 tgcggcaacg ctgttctacc cgatgtggca tctggaagtg gaaagcctgc tgggtgtgaa 6360
 aaacaaccgt ggtgtggaag gcaaccgcgt gcgtcatatg gactacgggg taaaaatcaa 6420
 caaactgatg tatacccgtc tgctgaaagg tgaagatata accctgttca gcccgtcga 6480
 cgtaccgggg ctgtacgacg cgttcttcgc cgatcaggaa gagtttgaac gtctgtatac 6540
 caaatatgag aaagacgaca gcatccgcaa gcagcgtgtg aaagccgttg agctgttctc 6600
 gctgatgatg caggaacgtg cgtctaccgg tcgtatctat attcagaacg ttgaccactg 6660
 caatacccat agcccgtttg atccggccat ccgcgccagtg cgtcagtcta acctgtgect 6720
 ggagatagcc ctgccgacca aaccgctgaa cgacgtcaac gacgagaacg gtgaaatcgc 6780
 gctgtgtacg ctgtctgctt tcaacctggg cgcaattaat aacctggatg aactggaaga 6840
 gctggcaatt ctggcggttc gtgcacttga ccgcgtgctg gattatcagg attaccgat 6900
 cccggccgcc aaacgtggag cgatgggtcg tcgtacgctg ggtattggtg tgatcaactt 6960
 cgcttactac ctggcgaagc acggtaaacg ctactccgac ggcagcgcca acaacctgac 7020
 gcataaaacc ttgaagcca ttcagtatta cctgctgaaa gcctctaatag agctggcgaa 7080
 agagcaaggc gcgtgcccggt ggtttaacga aaccacttac gcgaaaggga tctgccgat 7140
 cgatacctat aagaaagatc tggataccat cgctaataag ccgctgcatt acgactggga 7200

agctctgcgt gagtcaatca aaacgcacgg tctgcgtaac tccacgcttt ctgctctgat 7260
 gccgtccgag acttcttcgc agatctctaa cgccactaac ggtattgaac cgccgcgcgg 7320
 ttacgtcagc atcaaagcgt cgaaagacgg tattttgcgc caggtggtgc cggactacga 7380
 gcacctgcac gacgcctatg agctgctgtg ggaaatgccg ggtaacgatg gttatctgca 7440
 actggtgggt atcatgcaga aatttatcga tcagtcgac tctgccaaca ccaactacga 7500
 tccgtcacgc ttcccgtcag gaaaagtgcc gatgcagcag ttgctgaaag acctgctcac 7560
 cgcctacaaa ttcgggggtca aaacactgta ttatcagaac acccgtgacg gcgctgaaga 7620
 cgcacaagac gatctggtgc cgtcaatcca ggacgatggc tgcgaaagcg gcgcatgtaa 7680
 gatctgatat tgagatgccg gatgcggcgt aaacgcctta tccggcctac ggctcggttt 7740
 gtaggcctga taagacgcgc cagcgtcgca tcaggctccg ggtgccggat gcagcgtgaa 7800
 cgccttatcc ggctacggc tcggatttgt aggcctgata agacgcgcca gcgtcgcac 7860
 aggcacagga tgcggcgtaa aatgccttat ccggcattaa actcccaaca ggacacactc 7920
 atggcatata ccaccttttc acagacgaaa aatgatcagc tcaaagaacc gatgttcttt 7980
 ggtcagccgg tcaacgtggc tcgctacgat cagcaaaaat atgacatctt cgaaaagctg 8040
 atcgaaaagc agctctcttt cttctggcgt ccggaagaag ttgacgtctc ccgcgaccgt 8100
 atagattacc aggcgctgcc ggagcacgaa aaacacatct ttatcagcaa cctgaaatat 8160
 cagacgtgc tggattccat tcagggtcgt agcccgaacg tggcgctatt gccgcttatt 8220
 tctattccgg aactggaaac ctgggtcgaa acctgggcgt tctcagaaac gattcattcc 8280
 cgttcctata ctcatatcat tcgtaatatc gttaacgatc cgtctgttgt gtttgacgat 8340
 atcgtcacca acgagcagat ccagaaacgt gcggaaggga tctccagcta ttacgatgag 8400
 ctgatcgaaa tgaccagcta ctggcatctg ctgggcgaag gtaccacac cgttaacgg 8460
 aaaactgtga ccgttagcct gcgcgagctg aagaaaaaac tgtatctctg cctgatgagc 8520
 gttaacgcgc tggaagcgat tcgtttctac gtcagctttg cttgttcctt cgcatttgca 8580
 gaacgcgaat tgatggaagg caacgcaaaa attattcgcc tgattgccg cgacgaagcc 8640
 ctgcacctga ccggcaccca gcatatgctg aatctgctgc gcagcggcgc ggacgatcct 8700
 gagatggcgg aaattgccga agagtgtgag caggagtgt atgacctgtt tgttcaggca 8760
 gctcaacagg agaaagactg gccggattat ctgttccgcg acggttcgat gattggtctg 8820
 aataaagaca ttctctgcca gtacgttgaa tacatcacca atatccgtat gcaggcagtc 8880

ggttttgatc	tgccgttcca	gacgcgctcc	aacccgatcc	cgtggatcaa	cacttggtg	8940
gtgtctgata	acgtgcagg	tgctccgcag	gaagtggaag	tcagttctta	tctggtcggg	9000
cagattgact	cggaagtgga	caccgacgat	ttgagtaact	tccagctctg	atg gcc	9056
					Met Ala	
					1	
cgc gtt acc ctg cgc atc act ggc aca caa ctg ctg tgc cag gat gaa	9104					
Arg Val Thr Leu Arg Ile Thr Gly Thr Gln Leu Leu Cys Gln Asp Glu						
5 10 15						
cac cct tcc ctt ctg gcg gcg ctg gaa tcc cac aat gtg gcg gtt gag	9152					
His Pro Ser Leu Leu Ala Ala Leu Glu Ser His Asn Val Ala Val Glu						
20 25 30						
tac cag tgt cgc gaa ggt tac tgc ggc tcc tgt cgc aca cgc ctg gtt	9200					
Tyr Gln Cys Arg Glu Gly Tyr Cys Gly Ser Cys Arg Thr Arg Leu Val						
35 40 45 50						
gca ggt caa gtt gac tgg att gcc gaa ccg tta gcc ttt att cag ccg	9248					
Ala Gly Gln Val Asp Trp Ile Ala Glu Pro Leu Ala Phe Ile Gln Pro						
55 60 65						
ggg gaa att ttg ccc tgt tgt tgc cgg gca aaa ggc gat att gaa atc	9296					
Gly Glu Ile Leu Pro Cys Cys Cys Arg Ala Lys Gly Asp Ile Glu Ile						
70 75 80						
gag atg tga attggttgta gtgccagata caacgcttat gcgtcttatac	9345					
Glu Met						
85						
tggcctacaa cgattacatg gcgtagtaat acgctttcac ctgctcccag tccgctttgg	9405					
ggattggctc cagatatattt tccagctggc ggaagtcatg attaatcgct ttatcgcgac	9465					
gcaagcggcg acgacttttc tccaggtcaa gaaaaccagc ttctgcatta cttctgtgtt	9525					
tcacatagat atggcgaaca taacaacagc catgctgacg attaatgcta tgcattttct	9585					
taaacgccag cgccactgct ttcaacatgg cttgccgtac ttcgtcagaa taaggcgata	9645					
ctgcatgctg ggcataccag tcagcaatgc tgatgaacco cgccatatct tcagtcacca	9705					
gcaacgctcg ccattcacco tcaattttca ccgcttcacc aaaaacgata ttcggcacga	9765					
tgacaccggc ccgttccagt tctttaatta ccgcaacctc acggacaatc gttggtcggc	9825					
cgaacggata acgtacggaa tgaaacagat gatgcgtcat gcgctttaca tacagctttt	9885					
tgccgttgcg ctcgacgcat tgcacccgc tcataccatt acggcgatag ttaggctctt	9945					
caaccagtc gccctctgtt gccaccagt gattaaattc gtcgtacttt gctgaaactg	10005					
ccatacccta tcgcctgtca tttttattaa cgacaatgac tataggtggt tacctgagga	10065					
aatcttaat gaaacgtgtc gtattaatga atttcttttg ccactactag cttgacaccg	10125					

cttttaccct tcatttgca

10144

<210> 74

<211> 84

<212> PRT

<213> Escherichia coli

<400> 74

Met Ala Arg Val Thr Leu Arg Ile Thr Gly Thr Gln Leu Leu Cys Gln
 1 5 10 15

Asp Glu His Pro Ser Leu Leu Ala Ala Leu Glu Ser His Asn Val Ala
 20 25 30

Val Glu Tyr Gln Cys Arg Glu Gly Tyr Cys Gly Ser Cys Arg Thr Arg
 35 40 45

Leu Val Ala Gly Gln Val Asp Trp Ile Ala Glu Pro Leu Ala Phe Ile
 50 55 60

Gln Pro Gly Glu Ile Leu Pro Cys Cys Cys Arg Ala Lys Gly Asp Ile
 65 70 75 80

Glu Ile Glu Met

<210> 75

<211> 12354

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (9425)..(10183)

<400> 75

gacagcgcgt tttgggctac gccggaaaat ttgccaacaa tttaccgcaa gccgcgcgtc 60
 atgtacatgg aacatccttt tgccgcttca gaaatctctg gatcatgctc gcatgttgcg 120
 caatctactc gcccgccgc tgcgcttttc cttatactga gactgagcgt cgattcacct 180
 gcaaacggcg catttttaga ataatoctga ccttgtgctg aagagaaaac atgaaaattc 240
 ggcgcttatt ggtagcaatg agcgtggcaa cggctactgac tggttgccag aatatggact 300
 ccaacggact gctctcatca ggagcggaag cttttcaggc ttacagtttg agtgatgcgc 360
 aggtgaaaac cctgagcgat caggcatgtc aggagatgga cagcaaggcg acgattgcgc 420
 cagccaatag cgaatacgt aaacgtctga caactattgc caatgcgcta ggcaacaata 480
 tcaacgggtca gccggtaaat tacaaagtgt atatggcgaa ggatgtgaac gcctttgcaa 540
 tggctaacgg ctgtatccgc gtctatagcg ggctgatgga tatgatgacg gataacgaag 600

ggcggttat accaacta ccgagcaaat gtgggggacc gtgattgtcg gcctgaccaa 7500
 cgtacttgcc acctttatcg caatcggcct tgttgaccgc tggggacgta aaccaacgct 7560
 aacgctgggc ttcttggtga tggtgctgg catgggcgta ctcggtacaa tgatgcatat 7620
 cgggtattcac tctcgtcgg cgcagtatct cgcctatgcc atgctgctga tgtttattgt 7680
 cggttttgcc atgagtgcg gtccgctgat ttgggtactg tgctccgaaa ttcagccgct 7740
 gaaaggccgc gatattggca tcacctgctc cactgccacc aactggattg ccaacatgat 7800
 cgttggcgca acgttctga ccatgctcaa cacgctgggt aacgccaaca ccttctgggt 7860
 gtatgcggct ctgaacgtac tgtttatcct gctgacattg tggctggtac cggaaccaa 7920
 acacgtttcg ctggaacata ttgaacgtaa tctgatgaaa ggtcgtaaac tgcgcgaaat 7980
 aggcgctcac gattaatctc cccaagcttc ctccatcgc ggaggaagcc acctcttgca 8040
 gtcattttt ctctgctcta tctctgcgc ctatgaaaac atccgctctc cctatcgcca 8100
 tccaacaggc cgttatgcgt cgctgcggg aaaaactcgc ccaggccaac ctgaagctag 8160
 ggcgtaacta cccggagcca aaactctctt acaccagcg cggaacctcc gccggaacgg 8220
 cctggctgga aagctatgaa attgcctca atccgtttt gctgttgga aacagtgaag 8280
 cttttattga agaagtggta ccgcacgaac tggcacattt gctggtatgg aaacatttcg 8340
 gccgcgtagc gccacatggc aaagagtgg agtgatgat ggaaaacgtg ctgggtgttc 8400
 ccgcccgtcg tacgcatcag ttcgaaactgc aatccgtgcg tcgcaacacc tccccctacc 8460
 gctgcaagtg ccaggagcat cagcttaccg tacgccgcca taatcgcgta gttcgtggcg 8520
 aggcgctcta tcgctgtgtt cactgcgggtg aacagctgggt tgcgaaataa ccatctgaac 8580
 tatcaggaac tttctgacg tggtgattg catacaaaa cagctttcgc tacgttgctg 8640
 gctcgtttta acacggagta agtgatgtac cgttatttgt ctattgctgc ggtggtactg 8700
 agcgcagcat tttccggccc ggcgttgcc gaaggatatca atagtttttc tcaggcgaaa 8760
 gccgcggcgg taaaagtcca cgtgaacgcg cccggtacgt tttattgcgg atgtaaaatt 8820
 aactggcagg gcaaaaaagg cgttggtgat ctgcaatcgt gcggctatca ggtgcgcaaa 8880
 aatgaaaacc gcgcagccg cgtagagtgg gaacatgtcg tccccgctg gcagttcggg 8940
 caccagcgcc agtgctggca ggacggtgga cgtaaaaact gcgctaaaga tccggtctat 9000
 cgcaagatgg aaagcgatat gcataacctg cagccgtcag tcggtgaggt gaatggcgat 9060
 cgcggaact ttatgtacag ccagtggaat ggcggtgaag gccagtacgg tcaatgcgcc 9120

atgaagggtcg atttcaaaga aaaagctgcc gaaccaccag cgcgtgcacg cgggtgccatt 9180
 gcgcgcacct acttctatat gcgcgaccaa tacaacctga cactctctcg ccagcaaacg 9240
 cagctgttca acgcatggaa caagatgtat ccggttaccg actgggagtg cgagcgcgat 9300
 gaacgcacgc cgaagggtgca gggcaatcat aaccgcgatg tgcaacgcgc ttgccaggcg 9360
 cgaaagagct aacctacact agcgggattc tttttgttaa cccctacccc acgcgtacaa 9420
 ccgc gtg ggg aga cga cgc gga ttt tta act atg cgt atc ccc cgc att 9469
 Val Gly Arg Arg Arg Gly Phe Leu Thr Met Arg Ile Pro Arg Ile
 1 5 10 15
 tat cat cct gaa cca ctg acc agc cat tct cac atc gcg ctt tgc gaa 9517
 Tyr His Pro Glu Pro Leu Thr Ser His Ser His Ile Ala Leu Cys Glu
 20 25 30
 gat gcc gcc aac cat atc ggg cgc gta ctg cgc atg ggg ccg ggg cag 9565
 Asp Ala Ala Asn His Ile Gly Arg Val Leu Arg Met Gly Pro Gly Gln
 35 40 45
 gcg ttg caa ttg ttt gac ggt agc aac cag gtc ttt gac gcc gaa att 9613
 Ala Leu Gln Leu Phe Asp Gly Ser Asn Gln Val Phe Asp Ala Glu Ile
 50 55 60
 acc agc gcc agc aaa aaa agc gtg gaa gtg aag gtg ctg gaa ggc cag 9661
 Thr Ser Ala Ser Lys Lys Ser Val Glu Val Lys Val Leu Glu Gly Gln
 65 70 75
 atc gac gat cgc gaa tct ccg ctg cat att cac ctc ggt cag gtg atg 9709
 Ile Asp Asp Arg Glu Ser Pro Leu His Ile His Leu Gly Gln Val Met
 80 85 90 95
 tcg cgt ggt gaa aaa atg gaa ttt act atc cag aaa tcg atc gaa ctc 9757
 Ser Arg Gly Glu Lys Met Glu Phe Thr Ile Gln Lys Ser Ile Glu Leu
 100 105 110
 ggt gta agc ctc att acg cca ctt ttt tct gag cgc tgc ggc gtt aaa 9805
 Gly Val Ser Leu Ile Thr Pro Leu Phe Ser Glu Arg Cys Gly Val Lys
 115 120 125
 ctg gat agt gaa cgt ctg aac aag aag ctt cag cag tgg cag aag att 9853
 Leu Asp Ser Glu Arg Leu Asn Lys Lys Leu Gln Gln Trp Gln Lys Ile
 130 135 140
 gca att gct gcc tgt gag cag tgt ggt cgt aac cgg gtg ccg gaa atc 9901
 Ala Ile Ala Ala Cys Glu Gln Cys Gly Arg Asn Arg Val Pro Glu Ile
 145 150 155
 cgt cca gcg atg gat ctg gaa gcc tgg tgt gca gag cag gat gaa gga 9949
 Arg Pro Ala Met Asp Leu Glu Ala Trp Cys Ala Glu Gln Asp Glu Gly
 160 165 170 175
 ctg aaa ctg aat ctt cac ccg cgc gcc agt aac agc atc aat acg ttg 9997
 Leu Lys Leu Asn Leu His Pro Arg Ala Ser Asn Ser Ile Asn Thr Leu
 180 185 190

11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38
 39
 40
 41
 42
 43
 44
 45
 46
 47
 48
 49
 50
 51
 52
 53
 54
 55
 56
 57
 58
 59
 60
 61
 62
 63
 64
 65
 66
 67
 68
 69
 70
 71
 72
 73
 74
 75
 76
 77
 78
 79
 80
 81
 82
 83
 84
 85
 86
 87
 88
 89
 90
 91
 92
 93
 94
 95
 96
 97
 98
 99
 100

ccg tta ccg gtt gaa cgc gtc cgc ctg ctg att ggc ccg gaa ggc ggt 10045
 Pro Leu Pro Val Glu Arg Val Arg Leu Leu Ile Gly Pro Glu Gly Gly
 195 200 205

tta tcg gca gat gaa att gcc atg act gcc cgc tat caa ttt act gat 10093
 Leu Ser Ala Asp Glu Ile Ala Met Thr Ala Arg Tyr Gln Phe Thr Asp
 210 215 220

atc ctg ttg gga cct cgc gtt ttg cgt aca gag aca act gcg ctc acc 10141
 Ile Leu Leu Gly Pro Arg Val Leu Arg Thr Glu Thr Thr Ala Leu Thr
 225 230 235

gcc att acc gcg cta caa gta cga ttt ggc gat ttg ggc taa 10183
 Ala Ile Thr Ala Leu Gln Val Arg Phe Gly Asp Leu Gly
 240 245 250

cggagaagaa taatgatcaa gctcggcattc gtgatggacc ccatcgcaaa catcaacatc 10243

aagaaagatt ccagttttgc tatgttgctg gaagcacagc gtcgtgggta cgaacttcac 10303

tatatggaga tgggcgatct gtatctgata aatggtgaag cccgcgccca taccgcacg 10363

ctgaacgtga agcagaacta cgaagagtgg ttttcgttcg tcggtgaaca ggatctgccg 10423

ctggccgata tcgatgtgat cctgatgcgt aaagaccgcg cgtttgatac cgagtttatac 10483

tacgcgacct atattctgga acgtgccgaa gagaaaggga cgctgatcgt taacaagccg 10543

cagagcctgc gcgactgtaa cgagaaactg tttaccgcct ggttctctga cttaacgccca 10603

gaaacgctgg ttacgcgcaa taaagcgcag ctaaaagcgt tctgggagaa acacagcgac 10663

atcattctta agccgctgga cggatatgggc ggcgcgtcga ttttccgcgt gaaagaaggc 10723

gatccaaacc tcggcgtgat tgccgaaacc ctgactgagc atggcactcg ctactgcatg 10783

gcgcaaaatt acctgccagc cattaaagat ggcgacaaac gcgtgctggt ggtggatggc 10843

gagccggtac cgtactgcct ggcgogtatt ccgcagggg gcgaaaccog tggcaatctg 10903

gctgccggtg gtcgcggtga acctcgtccg ctgacggaaa gtgactggaa aatcgcccg 10963

cagatcgggc cgacgctgaa agaaaaaggg ctgatttttg ttggtctgga tatcatcggc 11023

gaccgtctga ctgaaattaa cgtcaccagc ccaacctgta ttcgtgagat tgaagcagag 11083

tttccggtgt cgatcaccgg aatgttaatg gatgccatcg aagcacgttt acagcagcag 11143

taaccacact tagcgagaag gatctcgttg agactctgag tgacagcgcc cttctttcca 11203

cgcatactgg gcgctgttgc ttttttgaac caggaaacag aacctctgac aatgaattta 11263

cagcatcact ttcttattgc catgcctgct ctccaggatc cgattttccg tcgttccgtg 11323

gtctacattt gcgaacataa taccaatggt gcaatgggga tcatcgtaa caagccgctg 11383

gaaaatctca aaattgaagg gattctggaa aagctgaaga tcacgccgga gccgcgtgat 11443
 gaatcaatcc gtctggataa accggttatg ctccggcggtc cgctggctga agatcgcggg 11503
 tttattttgc atactccgcc ctccaatttt gttccagca ttgcatttc agacaacacg 11563
 gtaatgacca ctccccgca tgtgctggaa acgctcggca ccgataaaca accgtctgac 11623
 gtattggtgg ctctgggtta tgccctctgg gagaaaggtc aactggaaca agaaattctc 11683
 gataacgcgt cgctaacggc cccggcagat ctgaatattc tgttcaaac gccgattgcc 11743
 gaccgctggc gcgaggcggc aaaactgatt ggtgtggata ttctcaccat gcctgggtgtg 11803
 gcaggacacg cctgatgagt ggaaccttac tcgccttcga ctccggcacc aaaagcattg 11863
 gcgtagcggc cggccaacgc attacggca ccgctcgccc ttgacctga attaaagcac 11923
 aggacggtac gccggactgg aacattatcg agcgtttact gaaagagtgg cagccggacg 11983
 aaatcatcgt cggtttgccg ctgaatatgg acggcaccga gcaaccattg actgccagag 12043
 cgcgtaaatt tgccaaccgt attcatggcc gtttcggtgt tgaagtaaag ctccatgacg 12103
 agcgtcttag cactgtggaa gcccgttccg gtctgtttga acagggcggc tatcgggcgc 12163
 tcaacaaagg caaagttgac tctgcctctg cggttattat tctcgaaagc tatttcgagc 12223
 agggatatta aggcgattta aacgcctggc ggagtgtaaa taatatcatc gcgtcttatt 12283
 gccggatgcg gcgtgaacac cttatccagc acacatctgg cagcggctat aggtctgata 12343
 agacgcgtta g 12354

<210> 76

<211> 252

<212> PRT

<213> Escherichia coli

<400> 76

Val Gly Arg Arg Arg Gly Phe Leu Thr Met Arg Ile Pro Arg Ile Tyr
 1 5 10 15

His Pro Glu Pro Leu Thr Ser His Ser His Ile Ala Leu Cys Glu Asp
 20 25 30

Ala Ala Asn His Ile Gly Arg Val Leu Arg Met Gly Pro Gly Gln Ala
 35 40 45

Leu Gln Leu Phe Asp Gly Ser Asn Gln Val Phe Asp Ala Glu Ile Thr
 50 55 60

Ser Ala Ser Lys Lys Ser Val Glu Val Lys Val Leu Glu Gly Gln Ile
 65 70 75 80

Asp Asp Arg Glu Ser Pro Leu His Ile His Leu Gly Gln Val Met Ser

```
<210> 77
<211> 14820
<212> DNA
<213> Escherichia coli
```

<400> 77
cactttgtta acaactttta ctactcttta atgcagtatt aaagattaat cggtaacaaa 60

gcc ccc att ccc gaa ggt tct tca gcg cga gaa gca ttc tcc cac tct 157
Ala Pro Ile Pro Glu Gly Ser Ser Ala Arg Glu Ala Phe Ser His Ser
15 20 25

ctc gat ctc gcc cgt ctg gct gaa aag cgc ggc tat cat cgc tac tgg 205
Leu Asp Leu Ala Arg Leu Ala Glu Lys Arg Gly Tyr His Arg Tyr Trp
30 35 40 45

ctg gca gaa cac cac aat atg act ggc att gcc agt gct gcc acg tcg 253
 Leu Ala Glu His His Asn Met Thr Gly Ile Ala Ser Ala Ala Thr Ser
 50 55 60

gta ttg atc ggc tat ctg gcg gcg aat acc acc acg ctg cat ctg ggg 301
 Val Leu Ile Gly Tyr Leu Ala Ala Asn Thr Thr Thr Leu His Leu Gly
 65 70 75

tct ggc ggc gtg atg ttg cct aac cac tca ccg ttg gtc att gca gaa 349
 Ser Gly Gly Val Met Leu Pro Asn His Ser Pro Leu Val Ile Ala Glu
 80 85 90

cag ttc ggc acg ctt aat aca ctc tat ccg ggg cga atc gat ttg ggg 397
 Gln Phe Gly Thr Leu Asn Thr Leu Tyr Pro Gly Arg Ile Asp Leu Gly
 95 100 105

ctg ggt cgt gct ccg ggt agt gac caa cgg aca atg atg gcg cta cgt 445
 Leu Gly Arg Ala Pro Gly Ser Asp Gln Arg Thr Met Met Ala Leu Arg
 110 115 120 125

cgt cat atg agc ggc gat att gat aat ttc ccc cgc gat gtg gcg gag 493
 Arg His Met Ser Gly Asp Ile Asp Asn Phe Pro Arg Asp Val Ala Glu
 130 135 140

ctg gtg gac tgg ttt gac gcc cgc gat ccc aat ccg cat gtg cgc ccg 541
 Leu Val Asp Trp Phe Asp Ala Arg Asp Pro Asn Pro His Val Arg Pro
 145 150 155

gta cca ggc tat ggc gag aaa atc ccc gtg tgg ttg tta ggc tcc agc 589
 Val Pro Gly Tyr Gly Glu Lys Ile Pro Val Trp Leu Leu Gly Ser Ser
 160 165 170

ctt tac agc gcg caa ctg gcg gcg cag ctt ggt ctg ccg ttt gcg ttt 637
 Leu Tyr Ser Ala Gln Leu Ala Ala Gln Leu Gly Leu Pro Phe Ala Phe
 175 180 185

gcc tca cac ttc gcg ccg gat atg ctg ttc cag gcg ctg cat ctt tat 685
 Ala Ser His Phe Ala Pro Asp Met Leu Phe Gln Ala Leu His Leu Tyr
 190 195 200 205

cgc agc aac ttc aaa ccg tca gca cgg ctg gaa aaa cca tac gcg atg 733
 Arg Ser Asn Phe Lys Pro Ser Ala Arg Leu Glu Lys Pro Tyr Ala Met
 210 215 220

gtg tgc atc aat att atc gcc gcc gac agc aac cgc gac gct gaa ttt 781
 Val Cys Ile Asn Ile Ile Ala Ala Asp Ser Asn Arg Asp Ala Glu Phe
 225 230 235

ctg ttt acc tca atg cag caa gcc ttt gtg aag ctg cgc cgt ggc gaa 829
 Leu Phe Thr Ser Met Gln Gln Ala Phe Val Lys Leu Arg Arg Gly Glu
 240 245 250

acc ggg caa ctg ccg ccg ccg att caa aat atg gat cag ttc tgg tca 877
 Thr Gly Gln Leu Pro Pro Pro Ile Gln Asn Met Asp Gln Phe Trp Ser
 255 260 265

ccg tct gag cag tat ggc gtg cag cag gcg ctg agt atg tcg ttg gta 925

Pro Ser Glu Gln Tyr Gly Val Gln Gln Ala Leu Ser Met Ser Leu Val
 270 275 280 285

ggt gat aaa gcg aaa gtg cgt cat ggc ttg cag tcg atc ctg cgc gaa 973
 Gly Asp Lys Ala Lys Val Arg His Gly Leu Gln Ser Ile Leu Arg Glu
 290 295 300

acc gac gcc gat gag att atg gtc aac ggg cag att ttc gac cac cag 1021
 Thr Asp Ala Asp Glu Ile Met Val Asn Gly Gln Ile Phe Asp His Gln
 305 310 315

gcg cgg ctg cat tcg ttt gag ctg gcg atg gat gtt aag gaa gag ttg 1069
 Ala Arg Leu His Ser Phe Glu Leu Ala Met Asp Val Lys Glu Glu Leu
 320 325 330

ttg gga tag tgtgtcttaa cgcgggaagc cttatccgag ctggcaacgc 1118
 Leu Gly
 335

tgtcctacat agacctgata agcgaagcgc atcaggcatt gtgtaggcag cagaaatgtc 1178

ggataaggca ccgctgatta ctgatacacc ggcagtaaata taaagctoga taaaatatgc 1238

accagtgcgt tgccgacgcc aaacaccaga atcagcgcaa tcatcggtt gccaccccag 1298

acgcggaatt tcgggctgcc aaagcgttta cgcgatgcac gggctaacag cgcggaaca 1358

attgccgccc agatggtagc cgctaaacca gcataaccaa tggcgtacag gaatccgttc 1418

gggaacaaca gccccccac aactggcggg gcaaagggtca gcaatgcctt tttcaagcgg 1478

cccacagccg agtcgtcgaa accaaacaga tctgccagat agtcaaacaa acccagcgtt 1538

acgccgagga acgaactcgc taccgcaaag tttgagaaca cgaccagcag cagatccaga 1598

ctacggctgt tcagtagccc gcttaacgcc tgtaccagca catcaatatt accgcccttc 1658

tctgcaatac cgataaaactc cggacgcggg atgttaccba tcgtcgccag caaccagatg 1718

gtatacagcg ccagcgccat cagcgtaccg tacaccagac atttcacgat ggttttcgga 1778

tctttgcctt aatacttcat caggcttgcc acgttaccgt gataaccaa cgatgccaga 1838

cagaacggca gggctcatca cagatacggg gcataagacg cattgctttc ggcgacgttg 1898

aacaatgtcg caggctgcac atgccccagc aggtaccba aggtgaggaa gaaggtaatg 1958

actttcgccc ccagcacaat cgctgtcatg cgactgacgg ctttagtgct caaccacacc 2018

acaaacgcta ccagcaatgc aaaacaaaa cccgccgccc gtgcggggac gtttagtgac 2078

atctctgcga aggtgtgatg cagaatcgaa ccaactggcag aaatataggc ataggtcagg 2138

atatagagca caaaggcaat ggaaatgccg ttgaccacgt tccagccttt gccagcaaa 2198

tctttggtga tgggtgtcaaa actcgaaccg attctgtaat tcaggttagc ttccagaatc 2258

ggt gat aaa gcg aaa gtg cgt cat ggc ttg cag tcg atc ctg cgc gaa 973
 Gly Asp Lys Ala Lys Val Arg His Gly Leu Gln Ser Ile Leu Arg Glu
 290 295 300

agcatttcgt cagcttcac cagaaccaga ccgctcagtt tagagaggtc cagagtgcc 4058
 cgtttcaggt ggtccagcag acggcccggg gtaccgacaa cgatctgagg cccctgacgc 4118
 agggcgcgta attgcacgtc ataacgctgg ccgccgtaca gagcaaccac atttacgccg 4178
 cgcatgtgtt tagagaaatc cgtcattgct tcagcaacct gtaccgccag ttcgagggtc 4238
 ggtgccagca ccagaatctg tgggtgcttc agctcaggat caagattctg caacagaggt 4298
 aaagagaatg ctgcagtttt tccgctcccc gtctgggcca taccagaaac gtcgaggcca 4358
 ttcagcagat gtggaataca ctctgcctga attggagatg gtttttcgta acccagatcg 4418
 ttaagggctt caaggatagg agccttcagg cccagatctg caaaagtggg ttcgaattca 4478
 gccatgtagt acgtgtgcct caaaattaat ggcggccagt ctacataact catcatgaaa 4538
 ttgatcagca attttcattg aaaagtgtga accggctcaa agtaggtgta ttaacgaaca 4598
 acaacgccct caccggttaa ggtgatggca atcaaaaaag attacgggct gatgtgtaacg 4658
 tcagctattg ctggtccgat tctgccaggt catcttggtc ctggcccagg agcgataatt 4718
 ccaacaatgc gtatcgggtgc tcaacaaagt tatgaacgtt gttggcaacc gccagtttga 4778
 acagtgccgt ggcgctgtcc aaatccccca gacttaggta gtacttacct aaatagaagt 4838
 tggtttcaact gagatgctca gcgagcgagg tgttatccgt tgcgtccgcc ttgagccttt 4898
 ccattaacgt ctgttcgcta atgttgccca ggtagaactc gacaatgttc catccccact 4958
 gttccttato cgatttttcg aagtgtgttt tcaacacttc tttagcctgc ttctcatoga 5018
 gcttctgctc ggcgagataa agccacagac tacggaaagg atcattggga tcgtcttgat 5078
 aaaacgccag cagatcatct tgcgctaact tgtcacgacc gccgtaatat aatgcgatcc 5138
 cgcgattcaa gtgcgcgtag ttgtaagttg gatcaagctc aagtacagaa tcaaacgctt 5198
 cataggcagc atcaaaattg cctgcctgcg ttaaataatat gcctaagtaa ttgaataactt 5258
 caggcatatc cggtcggatt gccagcgctt gcgaaaaatc gttacgcgct aatgccctca 5318
 gaccgagact atcatacaac actccgcgct catataaaag ctgtgcgcgt tcgtcatcgg 5378
 ttaaagcccg actggcaagg atttggtcca tacgtgccag aatcacttcc tgcgtgtaaag 5438
 tcggttgcaa tgggtaccgg aggacttcac ttttacgcca ggaagtatta ctgcatcctg 5498
 caagcgtaag tgctgtcgca acgaaacacc agcgcaaaaa aggcttcatt tcccactccc 5558
 gaagaccacg gttgaatgaa cgtcctgttc ccggttgcta acaaggcgct ctgcccgggtt 5618
 aaaagcccc ccgcgcagcg gagggcaaat ggcaacctta ctgcacctgt tcagcagccg 5678

agcatttcgt cagcttcac cagaaccaga ccgctcagtt tagagaggtc cagagtgcc 4058
 cgtttcaggt ggtccagcag acggcccggg gtaccgacaa cgatctgagg cccctgacgc 4118
 agggcgcgta attgcacgtc ataacgctgg ccgccgtaca gagcaaccac atttacgccg 4178
 cgcatgtgtt tagagaaatc cgtcattgct tcagcaacct gtaccgccag ttcgagggtc 4238
 ggtgccagca ccagaatctg tgggtgcttc agctcaggat caagattctg caacagaggt 4298
 aaagagaatg ctgcagtttt tccgctcccc gtctgggcca taccagaaac gtcgaggcca 4358
 ttcagcagat gtggaataca ctctgcctga attggagatg gtttttcgta acccagatcg 4418
 ttaagggctt caaggatagg agccttcagg cccagatctg caaaagtggg ttcgaattca 4478
 gccatgtagt acgtgtgcct caaaattaat ggcggccagt ctacataact catcatgaaa 4538
 ttgatcagca attttcattg aaaagtgtga accggctcaa agtaggtgta ttaacgaaca 4598
 acaacgccct caccggttaa ggtgatggca atcaaaaaag attacgggct gatgtgtaacg 4658
 tcagctattg ctggtccgat tctgccaggt catcttggtc ctggcccagg agcgataatt 4718
 ccaacaatgc gtatcgggtgc tcaacaaagt tatgaacgtt gttggcaacc gccagtttga 4778
 acagtgccgt ggcgctgtcc aaatccccca gacttaggta gtacttacct aaatagaagt 4838
 tggtttcaact gagatgctca gcgagcgagg tgttatccgt tgcgtccgcc ttgagccttt 4898
 ccattaacgt ctgttcgcta atgttgccca ggtagaactc gacaatgttc catccccact 4958
 gttccttato cgatttttcg aagtgtgttt tcaacacttc tttagcctgc ttctcatoga 5018
 gcttctgctc ggcgagataa agccacagac tacggaaagg atcattggga tcgtcttgat 5078
 aaaacgccag cagatcatct tgcgctaact tgtcacgacc gccgtaatat aatgcgatcc 5138
 cgcgattcaa gtgcgcgtag ttgtaagttg gatcaagctc aagtacagaa tcaaacgctt 5198
 cataggcagc atcaaaattg cctgcctgcg ttaaataatat gcctaagtaa ttgaataactt 5258
 caggcatatc cggtcggatt gccagcgctt gcgaaaaatc gttacgcgct aatgccctca 5318
 gaccgagact atcatacaac actccgcgct catataaaag ctgtgcgcgt tcgtcatcgg 5378
 ttaaagcccg actggcaagg atttggtcca tacgtgccag aatcacttcc tgcgtgtaaag 5438
 tcggttgcaa tgggtaccgg aggacttcac ttttacgcca ggaagtatta ctgcatcctg 5498
 caagcgtaag tgctgtcgca acgaaacacc agcgcaaaaa aggcttcatt tcccactccc 5558
 gaagaccacg gttgaatgaa cgtcctgttc ccggttgcta acaaggcgct ctgcccgggtt 5618
 aaaagcccc ccgcgcagcg gagggcaaat ggcaacctta ctgcacctgt tcagcagccg 5678

ccacacagaa cgatatcgcc cttgtgcaga gtaccttcac gtaccagaac ggtagcaacc 10898
 ggaccacgac ctttatcgag gaaggattcg ataaccgcac cgctcgccat acctttacgt 10958
 accgctttca gtcacagaac ttccgcctgc agcaggatag cgtccagcag ttcacgata 11018
 ccggtaccg ctttcgcaga tacgtgtacg aactggcttt caccgcccc a cttttccggc 11078
 aggatgccgt actgggagag ttctgttcta acgcgatccg gatcagcttc tggtttatcg 11138
 atcttgttca ctgcaaccac caccgggtacc tgcgcgcgtt tcgcgtgctg gattgcttcg 11198
 atggtctgcg gcatcacacc gtcgtcggca gcaacaacca ggactacgat gtccgttgcc 11258
 tgcgcaccac gagcacgcat tgaagtaaac gcggcgtgcc ccggggtgtc caggaagggtg 11318
 atcatgccgt tttcagtttc aacgtggtat gcaccaatgt gctgggtaat gccgcccgt 11378
 tcgccagagg ccactttcgt tgaacgaatg tagtcagca gagaggtttt accgtgggtca 11438
 acgtgacca tgatgggtcac aaccggcgcg cgcggttcag ccgcagcacc cgtgtcacgg 11498
 tcgctcatta ccgcctcttc cagctcgttt tcacgacgca ggataacttt atggcccac 11558
 tottcagcaa ccagctgtgc ggttttctga tcgataacct ggttgatggt tgccattgcg 11618
 ccagtttca tcacgcttt gatgacctga gagcctttaa ccgccatctt gttcgccagt 11678
 tcgccaacgg tgatagtttc gcogatcaca acgtcacggt taacggcctg agcaggcttc 11738
 tggaagcctt gctgcagcga agaaccttta cgttttccgc ctttaccgcc acgtactgct 11798
 gcgcgtgctt cttcacgac agcttttgat tcagcgtggt tgttgccctt cttcgacgc 11858
 gctgctttcg cgttacgacc acggccacgg ccgccttcga cttcacgac gctttcgtct 11918
 tctgcctggc gagcatgttg agaagtagtg acgtgataat cgctggaatc ttcagtcggt 11978
 tccgcgttat cagtccattt gttttcttcc gccatacgac gtgcttcttc agcaacgcga 12038
 cgtgcttctt cttcgagttt acgacgcgt tcttcttcag ctttacgctt gagctctgca 12098
 gcttctgct caccggcggc tttttcagcc tgggcgtttt tagtcatatc gtcttggtga 12158
 ttgctcactt tgtctttttc cgcagcttca cgtttcgtt gttcagcagc ttcacgctta 12218
 gcttgctctg cggcctcacg ttcagctttt tgttgccgtt ccgcttttagc cgattcttct 12278
 gcctcacgac gggcttgctc ttccgcttca cgtgcgctt gctcttccgc tgcaaggcgt 12338
 tcagcctctt gcggatcgcg tttcaciaag gtgcgtttct tgcggacttc gatttgatcc 12398
 gatttgcttt ttccaccggt accaggaatg ttaagggtgc tgcgtgtttt acgttgacgc 12458
 gtcaatttgt ccgggcctga atttttctga ttcaggtggt caatcaaagt ctgtttctct 12518

10898 10958 11018 11078 11138 11198 11258 11318 11378 11438 11498 11558 11618 11678 11738 11798 11858 11918 11978 12038 12098 12158 12218 12278 12338 12398 12458 12518

tgtgcagaca cagagtcgtc agcagacttc cggatacctg catcagcaaa ttgctgtacc 12578
 aggcgttcca cggaggtctg tcgctctgcg gccagcgttt taatcggttac atctgtcatg 12638
 ctgttccttc ctgctacagt ttattacgct tcgtcacoga accagcaaat attacgggca 12698
 gccataatca gtgctccggc tttttcgtcg gtcaaccctt cgatatcagc cagatcatca 12758
 atgccctggt cggcgagatc ttccagcgta caaacgccac gggcggccag tttgaatgcc 12818
 aaatcacgat ctacccttc aaggttcagc agatcgtcag ccggtttggt atcacggagg 12878
 ctttcttctt gggcctgtgc aatggtggcc agtgcatttt tagcacgctc gcgcagtgt 12938
 tcaacggctg gtcctcaag gccttcgatt tccaacagct ctttcatcgg cacataggcc 12998
 aattcttcca ggcgcagaa gccttcttct accagaacag tcgcgaagtc ttcgtcgatg 13058
 tcgagatatt tggatgaagg gtgcgctcgt gcgtgcgctt ccgcctgatg cttagcctgc 13118
 aggtcgtcaa cggtcctcac gttgagttcc caaccgctca gctgcgaagc cagacgcacg 13178
 ttctgaccgt tacggccaat cgctgcgccc aggttaccgg cttcaacggc gatatccatg 13238
 gtgtgtttat cttcatccac cacgatagaa gcaacgtctg ccggtgccat tgcgttaatc 13298
 acgaactgag ccgggttctc atccacagg acgatatcga tacgctcgcc accagttca 13358
 gtagacaccg cctgaacacg cgcgccacgc atacctacgc aagcacctac cggatcgata 13418
 cgtttatcgt tggttttcac cgcgattttc gcacgagaac ccggtcgcg agccgctgct 13478
 ttaatttcaa tcaattcttc gccgatttct ggcacttcaa tacggaacag ttcgatcagc 13538
 atttccggtt tggaacgagt gacgaacagt tgcgcgccac gcgcttccgg gcgaacggaa 13598
 tagagcacgc cacgaacgcg gtgcgccagg cggaagtttt cacgcggcag catatcttcg 13658
 cgcaggatca cggcttcagc gttgttgccc agatccagag agatgttgtc gcggtttact 13718
 tttttcacca cgcgggtgat gatttcacct tcgtgttcac ggaactgatc aaccaccatc 13778
 gcacgttcgg cttcacgcac tttctgcagc ataacctgtt ttgccgtctg gtagtgata 13838
 cgggtcaaagg taacagactc aatctgatct tcaacgtaac cgcccagggt caggctttca 13898
 tcttcataac gtgcggcttc aaggggtgatt tcttggtcgc gctgggtgac ttcataca 13958
 actaaccagc gacggaaagt gtcaaaatca ccgcttttgc gatcgatctg tacgcggacg 14018
 tcgatctctt gttcataatt tttctttggt gctgtcgcca gcgcgcttc caatgcttcg 14078
 aaaatcttct cgcgaggtag cgcttttca ttggatacgg cttcaactac agccaaaatt 14138
 tctttgttca tcgcgggctt ttcacctcat ccagactatt aaaagtgggg aaccagggtc 14198
 gccttctgga tattactcag cgcgaacact tcatctttac cttcgacggg aactgtgatc 14258

aggcgttcca cggaggtctg tcgctctgcg gccagcgttt taatcggttac atctgtcatg 12638
 ctgttccttc ctgctacagt ttattacgct tcgtcacoga accagcaaat attacgggca 12698
 gccataatca gtgctccggc tttttcgtcg gtcaaccctt cgatatcagc cagatcatca 12758
 atgccctggt cggcgagatc ttccagcgta caaacgccac gggcggccag tttgaatgcc 12818
 aaatcacgat ctacccttc aaggttcagc agatcgtcag ccggtttggt atcacggagg 12878
 ctttcttctt gggcctgtgc aatggtggcc agtgcatttt tagcacgctc gcgcagtgt 12938
 tcaacggctg gtcctcaag gccttcgatt tccaacagct ctttcatcgg cacataggcc 12998
 aattcttcca ggcgcagaa gccttcttct accagaacag tcgcgaagtc ttcgtcgatg 13058
 tcgagatatt tggatgaagg gtgcgctcgt gcgtgcgctt ccgcctgatg cttagcctgc 13118
 aggtcgtcaa cggtcctcac gttgagttcc caaccgctca gctgcgaagc cagacgcacg 13178
 ttctgaccgt tacggccaat cgctgcgccc aggttaccgg cttcaacggc gatatccatg 13238
 gtgtgtttat cttcatccac cacgatagaa gcaacgtctg ccggtgccat tgcgttaatc 13298
 acgaactgag ccgggttctc atccacagg acgatatcga tacgctcgcc accagttca 13358
 gtagacaccg cctgaacacg cgcgccacgc atacctacgc aagcacctac cggatcgata 13418
 cgtttatcgt tggttttcac cgcgattttc gcacgagaac ccggtcgcg agccgctgct 13478
 ttaatttcaa tcaattcttc gccgatttct ggcacttcaa tacggaacag ttcgatcagc 13538
 atttccggtt tggaacgagt gacgaacagt tgcgcgccac gcgcttccgg gcgaacggaa 13598
 tagagcacgc cacgaacgcg gtgcgccagg cggaagtttt cacgcggcag catatcttcg 13658
 cgcaggatca cggcttcagc gttgttgccc agatccagag agatgttgtc gcggtttact 13718
 tttttcacca cgcgggtgat gatttcacct tcgtgttcac ggaactgatc aaccaccatc 13778
 gcacgttcgg cttcacgcac tttctgcagc ataacctgtt ttgccgtctg gtagtgata 13838
 cgggtcaaagg taacagactc aatctgatct tcaacgtaac cgcccagggt caggctttca 13898
 tcttcataac gtgcggcttc aaggggtgatt tcttggtcgc gctgggtgac ttcataca 13958
 actaaccagc gacggaaagt gtcaaaatca ccgcttttgc gatcgatctg tacgcggacg 14018
 tcgatctctt gttcataatt tttctttggt gctgtcgcca gcgcgcttc caatgcttcg 14078
 aaaatcttct cgcgaggtag cgcttttca ttggatacgg cttcaactac agccaaaatt 14138
 tctttgttca tcgcgggctt ttcacctcat ccagactatt aaaagtgggg aaccagggtc 14198
 gccttctgga tattactcag cgcgaacact tcatctttac cttcgacggg aactgtgatc 14258

atttcaccgt ctaccgcttt gataacgccc tgccatttac gacgggtttg taccgccata 14318
 cggagaacca gagtcacctc ttctccgaca aaacggggtg agtggttcagc cgtgaacagt 14378
 gggcgatcga gacccggtga ggagacttcc aggttataag caacggtgat gggatcttca 14438
 acatccagca cagcacttac ctggtggctc acatcagcac aatcatcaac attgatgcc 14498
 tcttcactat caatatagat gcgcagtgtg gatgtgcgac cgcgaataaa ttcgatgcc 14558
 accagttcaa aaccagggc ctcaactggc gcagtaatca tctctgttaa tttttgctct 14618
 aatgtggaca agcccacccc caagacataa aaaaagggtc taaagcccag ttattctgta 14678
 gtcagataac aaaaaacccc gataaatcgg ggctttatat aactgaacc tataaccgca 14738
 actgcggtct ggagcacttt ccagaaggat tttttcaaat ccactacga aggccgaagt 14798
 cttcacagta tatttgaaaa ag 14820

<210> 78

<211> 335

<212> PRT

<213> Escherichia coli

<400> 78

Met Thr Asp Lys Thr Ile Ala Phe Ser Leu Leu Asp Leu Ala Pro Ile
 1 5 10 15

Pro Glu Gly Ser Ser Ala Arg Glu Ala Phe Ser His Ser Leu Asp Leu
 20 25 30

Ala Arg Leu Ala Glu Lys Arg Gly Tyr His Arg Tyr Trp Leu Ala Glu
 35 40 45

His His Asn Met Thr Gly Ile Ala Ser Ala Ala Thr Ser Val Leu Ile
 50 55 60

Gly Tyr Leu Ala Ala Asn Thr Thr Thr Leu His Leu Gly Ser Gly Gly
 65 70 75 80

Val Met Leu Pro Asn His Ser Pro Leu Val Ile Ala Glu Gln Phe Gly
 85 90 95

Thr Leu Asn Thr Leu Tyr Pro Gly Arg Ile Asp Leu Gly Leu Gly Arg
 100 105 110

Ala Pro Gly Ser Asp Gln Arg Thr Met Met Ala Leu Arg Arg His Met
 115 120 125

Ser Gly Asp Ile Asp Asn Phe Pro Arg Asp Val Ala Glu Leu Val Asp
 130 135 140

Trp Phe Asp Ala Arg Asp Pro Asn Pro His Val Arg Pro Val Pro Gly
 145 150 155 160

Tyr Gly Glu Lys Ile Pro Val Trp Leu Leu Gly Ser Ser Leu Tyr Ser
 165 170 175
 Ala Gln Leu Ala Ala Gln Leu Gly Leu Pro Phe Ala Phe Ala Ser His
 180 185 190
 Phe Ala Pro Asp Met Leu Phe Gln Ala Leu His Leu Tyr Arg Ser Asn
 195 200 205
 Phe Lys Pro Ser Ala Arg Leu Glu Lys Pro Tyr Ala Met Val Cys Ile
 210 215 220
 Asn Ile Ile Ala Ala Asp Ser Asn Arg Asp Ala Glu Phe Leu Phe Thr
 225 230 235 240
 Ser Met Gln Gln Ala Phe Val Lys Leu Arg Arg Gly Glu Thr Gly Gln
 245 250 255
 Leu Pro Pro Pro Ile Gln Asn Met Asp Gln Phe Trp Ser Pro Ser Glu
 260 265 270
 Gln Tyr Gly Val Gln Gln Ala Leu Ser Met Ser Leu Val Gly Asp Lys
 275 280 285
 Ala Lys Val Arg His Gly Leu Gln Ser Ile Leu Arg Glu Thr Asp Ala
 290 295 300
 Asp Glu Ile Met Val Asn Gly Gln Ile Phe Asp His Gln Ala Arg Leu
 305 310 315 320
 His Ser Phe Glu Leu Ala Met Asp Val Lys Glu Glu Leu Leu Gly
 325 330 335

<210> 79

<211> 10281

<212> DNA

<213> Escherichia coli

<400> 79

tataacactg gagaataaaa tttatccggt gaatgtgggc ggaaaacaaa gaggaaaggg 60
 ggggggggcta atcggcaggg aaggccgccc cggatagcgg gcggcagaag gaatcagaat 120
 ttccaggtca gacgggctgc aagttgcaga ccgttaaaat catcggttg ggtgtcgtac 180
 cacactttac ctgccgtcag cccgagatta agttgtcag tcagcgggtg aatacgttgc 240
 agactgacgc tttcatgct gccgtagcgt gtttctggcg tccagtcata ggtgtaagca 300
 cctgttccgc ggcttagcca tagttgcgta taaccagtgc cgcgcggggtc attcagacgc 360
 acggaaatca tattgctata actaccacct gcatcgctgg agtcataatg ggtatagcgg 420
 tagctggtga tcaccgggcc agtatagagt gatacgccgc cttgccaggc atcgacttgc 480

tgactggggtt cacgtcttag cgtacttaaa aaccatagca acattgctat ggacatacag 3960
 ataaatatcc aggttttcat gcaatttgct caaagaatca ttttatgaat tacaaagcct 4020
 tcaccagat cgctattgac ctgttgctcg cgaaattgtg caactgcacg caggcgatca 4080
 tgacgcataat aatcgcgctg ttcctagctt ttatgttttt ttaatgcagc aagtttgact 4140
 gtgaaatatt cttctttaac ggattcaaaa acctgaggca taaatgaaag ccagggtactt 4200
 ggggtttcgt agcgcagaat ttgcggaata gttcggcagg caaccattga agcttgataa 4260
 acagcaagat gatcctgatg gcggctggca tcatgcatgg tatatacccg catgatttca 4320
 acatcagaag gaatttgatt tttaatgatg tcttccaggc cggaatcat atcattgagc 4380
 tgtaaatgag cgcgggtgtc agcaaaatta agatgaatag tttggtggca ccctaataatc 4440
 tttagggcgt tgcgcgattc ttcattggca tcgattatc catctgtgcc agagttgccg 4500
 gtagtcatca ccacggctgc gatataaatt cctttttgcg caagacgagc aagcgatgcg 4560
 ccacagccta attctatatc gtcaggatgt gcgccaatag caaggatacc ctttctttta 4620
 tttgccgaag aaaggagggc tgaatctaaa accttatcca cttaatgaca ctccatttta 4680
 tttattatac tacaagcaca acgatgcact cagagacgta atctctggcg cagccagatg 4740
 ttaatttata aatgttaaata gttgctaata actgaaaagc aagggttttc agaccgtgg 4800
 gttcgactgg gtaatgtttc tatgcaattc atatgttaag tgtttgtatg tttggtatgt 4860
 atagttattt tgttttatac attgtattta gatgtgattt agtttgtcaa ttaattgcat 4920
 ttaaaaaata tgttctgtga acaagcattg tttatataca ttatgtgaat gtaatatgag 4980
 agtgattgag aatgatacag tgatatatac aatgcgaata taatagtttt attatatgta 5040
 ttgatattga tagaaataat gaagtaataa atctcgtaat gtggttgttt atgcatcact 5100
 aaaatgaagt gtagtaattt tcccaattgt tagaacggag taattgcata tttaatcttt 5160
 ccttagccgt ttttttgcta agaataaaat catctgtgag ataacgacta attcttttaa 5220
 tgaatgtttt tattctgaa tactgctccc ataacaagac aggggagcag acaatcatgg 5280
 caatttcata gcgtaacaca cttcttgccg cactggcatt catcgctttt caggcacagg 5340
 cgggtgaacgt caccgtggcg tatcaaact cagccgaacc ggcgaaagt gctcaggccg 5400
 acaacacett tgctaaagaa agcggagcaa ccgtggactg gcgtaagttt gacagcggag 5460
 ccagcatcgt gcgggcgctg gcttcaggcg acgtgcaaat cggcaacctc ggttcagcc 5520
 cgttagcggg tgcagccagc caacagggtc cgattgaagt cttcttgctg gcgtcaaaac 5580
 tgggtaactc cgaagcgtg gtggtaaaga aaactatcag caaacggaa gatctgattg 5640

3960 4020 4080 4140 4200 4260 4320 4380 4440 4500 4560 4620 4680 4740 4800 4860 4920 4980 5040 5100 5160 5220 5280 5340 5400 5460 5520 5580 5640

gatcgcgatg ggacttagcc ctacggtacg cggcattctg gatccgataa tcgagcttta 7380
tcgtccggtg ccgcgcgtgg cttatttgcc gctgatggtg atctggtttg gtattggtga 7440
aacctcgaag atcttaactga tctatttagc gatttttgca ccggtggcga tgtcggcgct 7500
ggcgggggtg aaaagcgtgc agcaggttcg cattcgtgcc gccagtcgc tgggtgccag 7560
ccgtgcgcag gtgctgtggt ttgtcatttt gcccggtgcg ctgccgaaa tcctcaccgg 7620
attacgtatt ggtctggggg tgggctggtc tacgctggtg gcggcggagc tgattgccgc 7680
gacgcgcggt ttaggattta tggttcagtc agcgggtgaa tttctcgcaa ctgacgtggt 7740
gctggcgggg atcgcggtga ttgcgattat cgcctttctt ttagaactgg gtctgcgcgc 7800
gttacagcgc cgcctgacgc cctggcatgg agaagtacaa tgagtgaacg tctgagcatt 7860
accccgctgg ggccgtatat cggcgcacaa atttcgggtg ccgacctgac gcgcccgcta 7920
agcgataatc agtttgaaca gctttaccat gcggtgctgc gccatcaggt ggtgtttcta 7980
cgcgatcaag ctattacgcc gcagcagcaa cgcgcgctgg ccagcgttt tggcgaattg 8040
catattcacc ctgtttaccc gcattgcgaa ggggttgacg agatcatcgt gctggatacc 8100
cataacgata atccgccaga taacgacaac tggcataccg atgtgacatt tattgaaacg 8160
ccaccgcgag gggcgattct ggcagctaaa gagttacott cgaccggcgg tgatacgctc 8220
tggaccagcg gtattgcggc ctatgaggcg ctctctgttc ccttcgccca gctgctgagt 8280
gggctgcgtg cggagcatga tttccgtaaa tcgttcccgg aatacaaata ccgcaaaacc 8340
gaggaggaac atcaacgctg gcgcgaggcg gtgcgaaaa acccgccgtt gctacatccg 8400
gtggtgcgaa cgcattccgt gagcggtaaa caggcgtgt ttgtgaatga aggctttact 8460
acgcgaattg ttgatgtgag cgagaaagag agcgaagcct tgtaagttt tttgtttgcc 8520
catatcacca aaccggagtt tcaggtgcgc tggcgtggc aaccaaata tattgcgatt 8580
tgggataacc gcgtgacca gcactatgcc aatgccgatt acctgccaca gcgacggata 8640
atgcatcggg cgacgatcct tggggataaa ccgttttatc gggcggggtg atacgagagt 8700
ggacggtccc ctgcgccctt tggggagagg gttagggtga gggggcggtc accgtacttt 8760
caacaggtta actccccctt tctgagagga aacaaaatta acgcagaatc ttcttctcag 8820
ccaaatccag cgcaaagtag ctgaaaatca gatccgcacc cgcacgctta atcgaacct 8880
agctttcgag cagcactttc tcttcatcta tagcaccgcg cagcgcggcg aacttaatca 8940
tcgcatactc accgctcacc tgatacgcg caatcggcaa ttcagtacgt tcacgcagct 9000
cacgcacgat gtcgaggtac gctccagcag gtttaacat caggcagtct gcgccctggg 9060

cttcatccag cagtgattca cgaatcgctt cagcagcgtt cattgggttc atctgatagc 9120
 ttttgcggtc gccttttaaat gcgcttcgag cagcttcacg gaacggggcca taaaaggagg 9180
 aggcgaactt ggtcgaatac gacataatcg ccgtatcttt aaatcccgca gcgtccagcg 9240
 cctgacgaat cgctgttacc tggcgcgtcca tcgcggcgga aggggcgatg aagtctgcac 9300
 ctgcagcagc tgcaaccacg gcttgcttgc ctaaattttc cagagtcgag tcgttgtcga 9360
 cgccatgctc gcacagcaca ccgcagtgac cgtgagaagt gtattcacag aagcaggtgt 9420
 ctgacataac gatcatttct ggacaggtct gcttgagat gcgcgacata cgcgccacca 9480
 gtccatcttc ccgccaggca tcgctgcgag tttcatcggg atggtgagag atgccaaaag 9540
 tcatcacgga acgaataccg gcgttggcga tcggttcaat ttgcggtgcc agatgtttct 9600
 ctggaatgag catcacgcct ggcatggctt caacggcttt gtagtcgtca atttcttctt 9660
 caacaaagat cggcaacacc aggtcggtta ggctaagtgt tgtctcttca aacatagcgc 9720
 gcagcgcagg agatttgcgc aggcgacgag gcggttgat taagtctgtc atggtctgcc 9780
 tgatgtttgt ggaatcgagg gccatagtat acctgaagca gggtagggat gttttacgaa 9840
 agttgtcgcg atgttgacaa gaagagaatg gaagagaggc caggacatct ttttaataga 9900
 aacagcaata attttatatt cactgaaaat atttttaatc tttatttata gctgttggtt 9960
 attatttttt ggagtttggg tcgctgtgta taaattgaat aattaaaact ttgttgcata 10020
 ttcataggat atttatctgg tttgtgtttg tgatatttat tatgcgtatg cttcaaaaac 10080
 aaaattatct gcaacatggt gaaatactgt gcttttatga atttgatgag tgtttttctc 10140
 cataaattat atatgtccac attcggactt aggggaaaga ataattgaac cattcgtctg 10200
 taacgcagca taatcggttag cgcgaaacat aatatgtttt ctatgcattg ataattgatg 10260
 gatcaactta ttacgtccct g 10281

<210> 80

<211> 335

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 8798-9805 of seq id 79

<400> 80

Met	Pro	Leu	Asp	Ser	Thr	Asn	Ile	Arg	Gln	Thr	Met	Thr	Asp	Leu	Ile
1				5				10					15		

Gln Arg Pro Arg Arg Leu Arg Lys Ser Pro Ala Leu Arg Ala Met Phe

20					25					30						
Glu	Glu	Thr	Thr	Leu	Ser	Leu	Asn	Asp	Leu	Val	Leu	Pro	Ile	Phe	Val	
35					40					45						
Glu	Glu	Glu	Ile	Asp	Asp	Tyr	Lys	Ala	Val	Glu	Ala	Met	Pro	Gly	Val	
50					55					60						
Met	Arg	Ile	Pro	Glu	Lys	His	Leu	Ala	Arg	Glu	Ile	Glu	Arg	Ile	Ala	
65					70					75					80	
Asn	Ala	Gly	Ile	Arg	Ser	Val	Met	Thr	Phe	Gly	Ile	Ser	His	His	Thr	
85					90					95						
Asp	Glu	Thr	Gly	Ser	Asp	Ala	Trp	Arg	Glu	Asp	Gly	Leu	Val	Ala	Arg	
100					105					110						
Met	Ser	Arg	Ile	Cys	Lys	Gln	Thr	Val	Pro	Glu	Met	Ile	Val	Met	Ser	
115					120					125						
Asp	Thr	Cys	Phe	Cys	Glu	Tyr	Thr	Ser	His	Gly	His	Cys	Gly	Val	Leu	
130					135					140						
Cys	Glu	His	Gly	Val	Asp	Asn	Asp	Ala	Thr	Leu	Glu	Asn	Leu	Gly	Lys	
145					150					155					160	
Gln	Ala	Val	Val	Ala	Ala	Ala	Ala	Gly	Ala	Asp	Phe	Ile	Ala	Pro	Ser	
165					170					175						
Ala	Ala	Met	Asp	Gly	Gln	Val	Gln	Ala	Ile	Arg	Gln	Ala	Leu	Asp	Ala	
180					185					190						
Ala	Gly	Phe	Lys	Asp	Thr	Ala	Ile	Met	Ser	Tyr	Ser	Thr	Lys	Phe	Ala	
195					200					205						
Ser	Ser	Phe	Tyr	Gly	Pro	Phe	Arg	Glu	Ala	Ala	Gly	Ser	Ala	Leu	Lys	
210					215					220						
Gly	Asp	Arg	Lys	Ser	Tyr	Gln	Met	Asn	Pro	Met	Asn	Arg	Arg	Glu	Ala	
225					230					235					240	
Ile	Arg	Glu	Ser	Leu	Leu	Asp	Glu	Ala	Gln	Gly	Ala	Asp	Cys	Leu	Met	
245					250					255						
Val	Lys	Pro	Ala	Gly	Ala	Tyr	Leu	Asp	Ile	Val	Arg	Glu	Leu	Arg	Glu	
260					265					270						
Arg	Thr	Glu	Leu	Pro	Ile	Gly	Ala	Tyr	Gln	Val	Ser	Gly	Glu	Tyr	Ala	
275					280					285						
Met	Ile	Lys	Phe	Ala	Ala	Leu	Ala	Gly	Ala	Ile	Asp	Glu	Glu	Lys	Val	
290					295					300						
Val	Leu	Glu	Ser	Leu	Gly	Ser	Ile	Lys	Arg	Ala	Gly	Ala	Asp	Leu	Ile	
305					310					315					320	
Phe	Ser	Tyr	Phe	Ala	Leu	Asp	Leu	Ala	Glu	Lys	Lys	Ile	Leu	Arg		

100
 110
 120
 130
 140
 150
 160
 170
 180
 190
 200
 210
 220
 230
 240
 250
 260
 270
 280
 290
 300
 310
 320

agcgaccaat aatcaccttt tgctgattac caccggagag cgaaccaatt tgcgtccgat 1500
 gaccgcgcgt ttttaccgc atcgaatcaa tcaccactg ggtatcgctt ttcacccgcg 1560
 agttatccag taaaccaact ttatttttgt agttgcgaat attggaaatt aacgagttaa 1620
 aaccaatatac cagataggca taaattcccg ttgagcggcg ctccacagtt accagtgcga 1680
 atccatgggtt tatggcttcg ttggcattat ggttattgat ctgtttgccg tgcaacgtta 1740
 tggtgccagc cgattttctc cgaataccaa ataacgtctc aacaatatcg gtacgtttcg 1800
 cccccaccag accggcaata ccgaggatct cccctttatg cagatcaaac gagacatcgc 1860
 gaatcgacgg ctggcgcagt gacgtcaggt tacgtacctc gaggatgact tcgcccgggt 1920
 tgttttcttt gtcagggaaa cgctgggttaa gagaacgcc aaccatcatg gcgatgatct 1980
 tgtccatcgt cagtcctgcc agcgggttcg tggcgatcca ctgaccgtcg cgcaatacgg 2040
 taacttcatac acataactgg aagattttctt ccattttatg cgagatataa acaataccgc 2100
 agccgcgcctc ttttaattta cgaataatag tgaacagatg attgacctct tttcgggtta 2160
 acgaagaagt cggttcaccc ataatacaca ttttcgcgtt ataggaaaac gctttggcga 2220
 tttcgatcat ctgcatttgc gaaacggata atgtgccgac gcgcgcacgc ggatcgatat 2280
 caatatccag ttcgtcaaaa atcgcttttg tttcgcggta cttttgtcc tgatcgacaa 2340
 acatgccttt cgtgggatat cgcgccagcc acatgttata catcacgaa cgttgtaata 2400
 ccaggtttta ctctgtgtgt accatcgaaa taccattttc cagggttct tttgcagaat 2460
 ggaaatcgat ctctttacc tggaataaaa tggtgccgga gtctttttga taaataccaa 2520
 acaggcattt taataatgtc gattttctc caccgttttc cccattaat gcatggatag 2580
 aatgtggccg gacttttaaa ttaacgttat caagtgcctt aacaccagga aaggacttgt 2640
 tgataccgct catttccaac aagtattccc cggaggacgg agtcgttgag ctgaccatat 2700
 aattttacct tgttgccat acaataagg cgcagtaata gactgcgcc aatcagtctt 2760
 atttcttgct gaattcagcc aggttgtctt tatctacgcc aacataaggt acgcggacca 2820
 ctttggtgtc gattttccag ttggtgccat cagccgcacc tttaccatcg gccaggtttt 2880
 tcgccagatc aaaggctcgt ttcgcctggg tgtagcatc gttcagtaac gtgcccgcga 2940
 gtgcaccgga tttcaccagc gccagcgtt ctggcagcg atcgacgcca aacaccggaa 3000
 tgctggactt gttgtgtgct ttcagcgtt caaccgcgc cattgccatc gcacgttgt 3060
 tggcgataac cacttcgatt ttgttggcgt tcgggccaga cagccaggcg tccatcttat 3120
 ctttcgctg agcgggtgtc cacattgcgg tatctaactg taactgttca gttttgatgc 3180

agcgaccaat aatcaccttt tgctgattac caccggagag cgaaccaatt tgcgtccgat 1500
 gaccgcgcgt ttttaccgc atcgaatcaa tcaccactg ggtatcgctt ttcacccgcg 1560
 agttatccag taaaccaact ttatttttgt agttgcgaat attggaaatt aacgagttaa 1620
 aaccaatatac cagataggca taaattcccg ttgagcggcg ctccacagtt accagtgcga 1680
 atccatgggtt tatggcttcg ttggcattat ggttattgat ctgtttgccg tgcaacgtta 1740
 tggtgccagc cgattttctc cgaataccaa ataacgtctc aacaatatcg gtacgtttcg 1800
 cccccaccag accggcaata ccgaggatct cccctttatg cagatcaaac gagacatcgc 1860
 gaatcgacgg ctggcgcagt gacgtcaggt tacgtacctc gaggatgact tcgcccgggt 1920
 tgttttcttt gtcagggaaa cgctgggttaa gagaacgcc aaccatcatg gcgatgatct 1980
 tgtccatcgt cagtcctgcc agcgggttcg tggcgatcca ctgaccgtcg cgcaatacgg 2040
 taacttcatac acataactgg aagattttctt ccattttatg cgagatataa acaataccgc 2100
 agccgcgcctc ttttaattta cgaataatag tgaacagatg attgacctct tttcgggtta 2160
 acgaagaagt cggttcaccc ataatacaca ttttcgcgtt ataggaaaac gctttggcga 2220
 tttcgatcat ctgcatttgc gaaacggata atgtgccgac gcgcgcacgc ggatcgatat 2280
 caatatccag ttcgtcaaaa atcgcttttg tttcgcggta cttttgtcc tgatcgacaa 2340
 acatgccttt cgtgggatat cgcgccagcc acatgttata catcacgaa cgttgtaata 2400
 ccaggtttta ctctgtgtgt accatcgaaa taccattttc cagggttct tttgcagaat 2460
 ggaaatcgat ctctttacc tggaataaaa tggtgccgga gtctttttga taaataccaa 2520
 acaggcattt taataatgtc gattttctc caccgttttc cccattaat gcatggatag 2580
 aatgtggccg gacttttaaa ttaacgttat caagtgcctt aacaccagga aaggacttgt 2640
 tgataccgct catttccaac aagtattccc cggaggacgg agtcgttgag ctgaccatat 2700
 aattttacct tgttgccat acaataagg cgcagtaata gactgcgcc aatcagtctt 2760
 atttcttgct gaattcagcc aggttgtctt tatctacgcc aacataaggt acgcggacca 2820
 ctttggtgtc gattttccag ttggtgccat cagccgcacc tttaccatcg gccaggtttt 2880
 tcgccagatc aaaggctcgt ttcgcctggg tgtagcatc gttcagtaac gtgcccgcga 2940
 gtgcaccgga tttcaccagc gccagcgtt ctggcagcg atcgacgcca aacaccggaa 3000
 tgctggactt gttgtgtgct ttcagcgtt caaccgcgc cattgccatc gcacgttgt 3060
 tggcgataac cacttcgatt ttgttggcgt tcgggccaga cagccaggcg tccatcttat 3120
 ctttcgctg agcgggtgtc cacattgcgg tatctaactg taactgttca gttttgatgc 3180

ctttatcggt caattcttta atcacgtaag tggtagctgc ttctgcatcc ggatggcccg 3240
 gttcaccttt cagcagtaag aactgaatct gaccgtcttt gttcagatcc caaccctgat 3300
 tcgccgcca gtgttttagca atcaaactgc ctgaataat gccggactct ttggagtcag 3360
 tgccaacgta gtaggctttg tcgtagctat ccagcgctt acgagacggg tctttgttga 3420
 agaaaaccac cggcacgttt tgcccacggc ctttctcaat caccgtaccc gcagctgccg 3480
 ggtcaaccag gttgattgac agtgccttca ccccttctgc cagcaatacg tcgatctgat 3540
 cgttctgctt ggactgggtca ttctgagaat cattcatcag cagctgaaca tctggcggcg 3600
 ctttcgcata ttgtcaata gcttgcgca ctacagacat aaagtattcg tcgtacttat 3660
 agattgttac accaatgcga gtatcagcag cgtgtgcagc ggcaccgaat aacatgctgg 3720
 ccatcacagc agacaggggt aacaccttct tattcatggg atctccgggt tttcttatgc 3780
 agggtagtgc ttgagataaa tgctcggcgg gccagtagag ttaatgaagt gttactgaac 3840
 gccgaagctc actttttaa attcgttctt ccattgccgg taacgctcca gaaaacggct 3900
 ttaattgttg ttatgacgct gttacctcgg caaaagtgat tattcaactgt tacatacggg 3960
 ttacaacgtt aaaacgggtgc aatcatagct atcacattgt taagatactg tgaaatcact 4020
 cacagattga aagcgggtac atgcctgat ttgttgagtt agtgatgcc gccgattct 4080
 ggcgtgttgc gacagaatgg cgacgacta acgtcggcat aaaacagtgg ctggcacgag 4140
 gatcaatatt gctgtctgcc cctgcaagg ccagttcggg ggctaatttc gccattgaag 4200
 caatgggata acgcacggtc gtttaattgc ggtcgggtga acgggcatg ggaatatcat 4260
 cgaaaccgat gattgagaga tgtaacggaa tcgcaatgcc attatctttt aatgctgtca 4320
 gtgcgccagc ggccatattg tcgttataag caaatacagc ggtaagttgt agattgcgcc 4380
 ccagcagttc aaccatgcc gctcaccgc ccggcatgtc cggcgtagca gcgccaatcc 4440
 agctttccgg cggaataata tctgtctctt tcaacgcaat catccagcct gctttacgca 4500
 tggcgtcatc ttcaatgccg tggctggaag aaagataacc aatacgttga tgaccgttat 4560
 tcagcaacat gcgcgtgcc attcgggcac cgtgagatt atccaggcaa acgcaacgat 4620
 gggcgtaccc cggcacaacg cggttgatta acaccatacc gggaatgtta tccataaatt 4680
 gcgccagttc atcgtcactc aatgcttttg agtgaacaat caacgcatta caacgctggc 4740
 gaattaacac ctcaatggcg tgacgtctct tttccgcttc atgatagcta ttgccgatta 4800
 gcacgtatct ctgatgctgc tgagcgacca gatccaccgc ttttaccagc gcgccgaaaa 4860

acgctgatac tggcagggtgc atctttaaga ttttgttcca cggaagatgc agtgacaacc 10080
 atcgtttcgc catcatcatc gaccgctaac acaggccatg cacaagaaat agcggacaaa 10140
 cacagcccga ccggtacgaa agggttcaac ctaaaccattc catatctcca tgaggtaact 10200
 acgaaaataa aatgggttat cgctcacatc ttcttcacgt ccccttgcg acggcagcat 10260
 cgcggtggac ttatTTTTTTA tgcagggtgat catcccagaa agccggaaca gcctctgatt 10320
 tgtcagcctt ttttgattgc ggcgtaacga taa 10353

<210> 82

<211> 332

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 2759-3757 of seq id 81

<400> 82

Met Asn Lys Lys Val Leu Thr Leu Ser Ala Val Met Ala Ser Met Leu
 1 5 10 15

Phe Gly Ala Ala Ala His Ala Ala Asp Thr Arg Ile Gly Val Thr Ile
 20 25 30

Tyr Lys Tyr Asp Asp Asn Phe Met Ser Val Val Arg Lys Ala Ile Glu
 35 40 45

Gln Asp Ala Lys Ala Ala Pro Asp Val Gln Leu Leu Met Asn Asp Ser
 50 55 60

Gln Asn Asp Gln Ser Lys Gln Asn Asp Gln Ile Asp Val Leu Leu Ala
 65 70 75 80

Lys Gly Val Lys Ala Leu Ala Ile Asn Leu Val Asp Pro Ala Ala Ala
 85 90 95

Gly Thr Val Ile Glu Lys Ala Arg Gly Gln Asn Val Pro Val Val Phe
 100 105 110

Phe Asn Lys Glu Pro Ser Arg Lys Ala Leu Asp Ser Tyr Asp Lys Ala
 115 120 125

Tyr Tyr Val Gly Thr Asp Ser Lys Glu Ser Gly Ile Ile Gln Gly Asp
 130 135 140

Leu Ile Ala Lys His Trp Ala Ala Asn Gln Gly Trp Asp Leu Asn Lys
 145 150 155 160

Asp Gly Gln Ile Gln Phe Val Leu Leu Lys Gly Glu Pro Gly His Pro
 165 170 175

Asp Ala Glu Ala Arg Thr Thr Tyr Val Ile Lys Glu Leu Asn Asp Lys

180	185	190
Gly Ile Lys Thr Glu Gln Leu Gln Leu Asp Thr Ala Met Trp Asp Thr		
195	200	205
Ala Gln Ala Lys Asp Lys Met Asp Ala Trp Leu Ser Gly Pro Asn Ala		
210	215	220
Asn Lys Ile Glu Val Val Ile Ala Asn Asn Asp Ala Met Ala Met Gly		
225	230	235
Ala Val Glu Ala Leu Lys Ala His Asn Lys Ser Ser Ile Pro Val Phe		
245	250	255
Gly Val Asp Ala Leu Pro Glu Ala Leu Ala Leu Val Lys Ser Gly Ala		
260	265	270
Leu Ala Gly Thr Val Leu Asn Asp Ala Asn Asn Gln Ala Lys Ala Thr		
275	280	285
Phe Asp Leu Ala Lys Asn Leu Ala Asp Gly Lys Gly Ala Ala Asp Gly		
290	295	300
Thr Asn Trp Lys Ile Asp Asn Lys Val Val Arg Val Pro Tyr Val Gly		
305	310	315
Val Asp Lys Asp Asn Leu Ala Glu Phe Ser Lys Lys		
325	330	

<210> 83
 <211> 12368
 <212> DNA
 <213> Escherichia coli

<220>
 <221> CDS
 <222> (4397)..(5701)

<400> 83
 cagagaatgt cttttcagcg cattcgcagg cagaaatggg aataatggcg atatatacgg 60
 cagcaaaacg attttttgct taagaaatcg tgagttaagg ttgaaagagc aggtttaact 120
 cgaccatact ctatactcgc agtgtggcgc ggcgtagcat ggcgcaacgc atggctatatt 180
 gaaaaaggaa aatgtcgtgg cagaagaaac tatattcagc aaaattattc gtcgtgagat 240
 cccctccgat atcgtctacc aggatgatct ggtaacggcg tttcgcgata tttcgccgca 300
 agcgccaacg catattctga tcattccgaa tctctcatt ccgactgtga acgacgtctc 360
 agctgagcat gagcaggcgc tgggacgcat gatcaccgta gcggcaaaaa ttgctgagca 420
 agaaggtatt gccgaagatg gctatcgtct gatcatgaat accaaccgcc atggcggaca 480
 agaggtttac cacatccata tgcacttggt ggggtggcgt ccgctgggac caatgctggc 540

gcataaaggt ctgtaacgat gagaaaagga tgctttgggc tgggtgtctct ggtgtttgtta 600
ctgctgggtgg gctgtcgttc acatccggaa attccgggtga atgatgagca atcgctgggtg 660
atggagtcac ctttattggc tgcgggcac agtcagaaa agcccttcct ttcgacgtct 720
gatattcaac cttcagcatc ctcaacgctt tataacgaaa ggcaagaacc cgttaccgtt 780
cattatcggtt tttactggta tgacgccaga gggctggaga tgcacacctt ggaaaggcca 840
cgcagcggtta ccattccgc acattcggcg gtaacgctgt acggcagcgc caattttctg 900
ggggcgcaaca aagtcagact ttatctatat ttgtaagggg tgaatcttga tgacaaaaat 960
gagtcgctac gccttgatta ccgcgctggc gatgtttctc gccgggtgtg tggggcaacg 1020
tgaacctgca ccggtagaag aagtgaacc agcgcggaa caaccagccg agccacaaca 1080
gcctgtcccc acagtgcctt cggtgccgac gatcccgag cagccaggcc caattgagca 1140
cgaagatcaa actgcaccgc ctgcgcgca tattcgccat tatgactgga atggcgcaat 1200
gcagccgatg gtcagtaaga tgcttggggc tgacggggtg actgcgggta gcgtcctgct 1260
ggttgatagc gttaacaacc gtactaacgg ttcgctgaat gccgcagaag cgaccgaaac 1320
getgcgaaat gcgctggcta ataacgggaa atttaccctg gtttccgcc agcaactgtc 1380
gatggcgaag caacagttg gtttgtgcgc gcaggacagt ttaggcaccc gtagtaaagc 1440
cataggcatt gcccgcaatg tcggcgtca ttacgtgctg tactccagcg cctctggcaa 1500
cgttaacgct ccgaccctac aaatgcagct gatgctggtg cagacgggcg aaattatctg 1560
gtcaggtaaa ggtgccgttt cgcagcaata atcccatcac gcgcgacgaa ttgctgtgc 1620
gttttttccc gcagtatcat ccgctcacga cgtttaatag tgggcttagt ggcgggagtt 1680
ttctcattga acatcagggc cagcgttttg ttgtgcgtca gccgcacgat cctgatgcgc 1740
cgcagtcgcg gttcttgcgc cagtatcggg ctttatcaca actaccgca tgcattgcac 1800
cgaagccgca tttatatctc cgtgactgga tggtagtga ctatctgcc ggcgcggtaa 1860
aaacgtatth gccggatacc aacgaactgg caggcttgct gtattatcta catcaacaac 1920
cacgttttgg ctggcgaata acgctgttgc cgttactgga actgtactgg cagcaaagcg 1980
atccggcgcg gcggacagtg ggttggtgc gaatgttaa acgtctgcgc aaagcgcggg 2040
aaccacggcc tttacgtta agtccattgc atatggatgt ccacgccgga aatttagtgc 2100
atagcgcgtc agggttaaaa ctcatcgact gggagtatgc cggagatggt gatatcgcgc 2160
tggaactggc ggcgggtgtg gtggaaaata ctgaacagca ccggcaattg gtcaatgact 2220

ttacagcgc attaaagcgt tcaaaaccct cgggtaaattg ccctcgtcgc atcaggtaac 4020
 ettgccggta cctgatgcgc tccgaattct gtgggtcgga taaggcgctcc acgccgcac 4080
 cgacagtcga gcatcaatgc ctgatgcgt tcttatcagg cctaccgaac gccctgcata 4140
 caacctcac tctatatcac tctcacaat tgcgtcaa ataaacaat aaactctgtt 4200
 ttttgatctc acccggtaaa gtcgcctatc ttttcagcaa caaaacttga ttaacatcaa 4260
 ttttggtatg accaatgcac cattcatgtt attctcaata gcgaagaaca ttttcattgc 4320
 tgtaacctgt tgttaattaa gagctatgtt aataaccatt aattaacaat tggttaataa 4380
 atttaagggg gtcacg ttg act acg cca ttg aaa aag att gtg att gtc ggc 4432
 Leu Thr Thr Pro Leu Lys Lys Ile Val Ile Val Gly
 1 5 10
 ggc ggt gct ggt ggg ctg gaa atg gca aca cag ctg ggg cat aag ctg 4480
 Gly Gly Ala Gly Gly Leu Glu Met Ala Thr Gln Leu Gly His Lys Leu
 15 20 25
 gga cgc aag aaa aaa gcc aaa att acg ctg gtc gat cgt aac cac agc 4528
 Gly Arg Lys Lys Lys Ala Lys Ile Thr Leu Val Asp Arg Asn His Ser
 30 35 40
 cac ctg tgg aaa ccg ctg ctg cac gaa gtg gcg act ggc tcg ctt gat 4576
 His Leu Trp Lys Pro Leu Leu His Glu Val Ala Thr Gly Ser Leu Asp
 45 50 55 60
 gaa ggc gtc gat gcg ttg agc tat ctg gcc cat gcg cgc aat cat ggt 4624
 Glu Gly Val Asp Ala Leu Ser Tyr Leu Ala His Ala Arg Asn His Gly
 65 70 75
 ttc cag ttc cag ctg ggt tcc gtc att gat att gat cgt gaa gcg aaa 4672
 Phe Gln Phe Gln Leu Gly Ser Val Ile Asp Ile Asp Arg Glu Ala Lys
 80 85 90
 aca atc act att gca gaa ctg cgc gac gag aaa ggt gaa ctg ctg gtt 4720
 Thr Ile Thr Ile Ala Glu Leu Arg Asp Glu Lys Gly Glu Leu Leu Val
 95 100 105
 ccg gaa cgt aaa atc gcc tat gac acc ctg gta atg gcg ctg ggt agc 4768
 Pro Glu Arg Lys Ile Ala Tyr Asp Thr Leu Val Met Ala Leu Gly Ser
 110 115 120
 acc tct aac gat ttc aat acg cca ggt gtc aaa gag aac tgc att ttc 4816
 Thr Ser Asn Asp Phe Asn Thr Pro Gly Val Lys Glu Asn Cys Ile Phe
 125 130 135 140
 ctc gat aac ccg cac cag gcg cgt cgc ttc cac cag gag atg ctg aat 4864
 Leu Asp Asn Pro His Gln Ala Arg Arg Phe His Gln Glu Met Leu Asn
 145 150 155
 ttg ttc ctg aaa tac tcc gcc aac ctg ggc gcg aat ggc aaa gtg aac 4912
 Leu Phe Leu Lys Tyr Ser Ala Asn Leu Gly Ala Asn Gly Lys Val Asn

160										165										170																			
att	gcg	att	gtc	ggc	ggc	ggc	gcg	acg	ggg	gta	gaa	ctc	tcc	gct	gaa	4960																							
Ile	Ala	Ile	Val	Gly	Gly	Gly	Ala	Thr	Gly	Val	Glu	Leu	Ser	Ala	Glu																								
175										180										185																			
ttg	cac	aac	gcg	gtc	aag	caa	ctg	cac	agc	tac	ggg	tac	aaa	ggc	ctg	5008																							
Leu	His	Asn	Ala	Val	Lys	Gln	Leu	His	Ser	Tyr	Gly	Tyr	Lys	Gly	Leu																								
190										195										200																			
acc	aac	gaa	gcc	ctg	aac	gta	acg	ctg	gta	gaa	gcg	gga	gaa	cgt	att	5056																							
Thr	Asn	Glu	Ala	Leu	Asn	Val	Thr	Leu	Val	Glu	Ala	Gly	Glu	Arg	Ile																								
205										210										215										220									
ttg	cct	gcg	tta	ccg	cca	cgt	atc	tct	gct	gcg	gcc	cac	aac	gag	cta	5104																							
Leu	Pro	Ala	Leu	Pro	Pro	Arg	Ile	Ser	Ala	Ala	Ala	His	Asn	Glu	Leu																								
225										230										235																			
acg	aaa	ctt	ggc	gtt	cgc	gtg	ctg	acg	caa	acc	atg	gtc	acc	agt	gct	5152																							
Thr	Lys	Leu	Gly	Val	Arg	Val	Leu	Thr	Gln	Thr	Met	Val	Thr	Ser	Ala																								
240										245										250																			
gat	gaa	ggc	ggc	ctg	cac	act	aaa	gat	ggc	gaa	tat	att	gag	gct	gat	5200																							
Asp	Glu	Gly	Gly	Leu	His	Thr	Lys	Asp	Gly	Glu	Tyr	Ile	Glu	Ala	Asp																								
255										260										265																			
ctg	atg	gta	tgg	gca	gcc	ggg	atc	aaa	gcg	cca	gac	ttc	ctg	aaa	gat	5248																							
Leu	Met	Val	Trp	Ala	Ala	Gly	Ile	Lys	Ala	Pro	Asp	Phe	Leu	Lys	Asp																								
270										275										280																			
atc	ggg	ggg	ctt	gaa	act	aac	cgt	atc	aac	cag	ctg	gtg	gtg	gaa	ccg	5296																							
Ile	Gly	Gly	Leu	Glu	Thr	Asn	Arg	Ile	Asn	Gln	Leu	Val	Val	Glu	Pro																								
285										290										295										300									
acg	ctg	caa	acc	acc	cgc	gat	cca	gac	att	tac	gct	att	ggc	gac	tgc	5344																							
Thr	Leu	Gln	Thr	Thr	Arg	Asp	Pro	Asp	Ile	Tyr	Ala	Ile	Gly	Asp	Cys																								
305										310										315																			
gcg	tca	tgc	ccg	cgt	ccg	gaa	ggg	ggc	ttt	gtt	ccg	ccg	cgt	gct	cag	5392																							
Ala	Ser	Cys	Pro	Arg	Pro	Glu	Gly	Gly	Phe	Val	Pro	Pro	Arg	Ala	Gln																								
320										325										330																			
gct	gca	cac	cag	atg	gcg	act	tgc	gca	atg	aac	aac	att	ctg	gcg	cag	5440																							
Ala	Ala	His	Gln	Met	Ala	Thr	Cys	Ala	Met	Asn	Asn	Ile	Leu	Ala	Gln																								
335										340										345																			
atg	aac	ggg	aag	ccg	ctg	aaa	aat	tat	cag	tat	aaa	gat	cat	ggg	tgc	5488																							
Met	Asn	Gly	Lys	Pro	Leu	Lys	Asn	Tyr	Gln	Tyr	Lys	Asp	His	Gly	Ser																								
350										355										360																			
ctg	gta	tgc	ctg	tgc	aac	ttc	tcc	acc	gtc	ggg	agc	ctg	atg	ggg	aac	5536																							
Leu	Val	Ser	Leu	Ser	Asn	Phe	Ser	Thr	Val	Gly	Ser	Leu	Met	Gly	Asn																								
365										370										375										380									
ctg	acg	cgc	ggc	tca	atg	atg	att	gaa	gga	cga	att	gcg	cgc	ttt	gta	5584																							
Leu	Thr	Arg	Gly	Ser	Met	Met	Ile	Glu	Gly	Arg	Ile	Ala	Arg	Phe	Val																								
385										390										395																			

160 165 170
 att gcg att gtc ggc ggc ggc gcg acg ggt gta gaa ctc tcc gct gaa
 Ile Ala Ile Val Gly Gly Gly Ala Thr Gly Val Glu Leu Ser Ala Glu
 175 180 185
 ttg cac aac gcg gtc aag caa ctg cac agc tac ggt tac aaa ggc ctg
 Leu His Asn Ala Val Lys Gln Leu His Ser Tyr Gly Tyr Lys Gly Leu
 190 195 200
 acc aac gaa gcc ctg aac gta acg ctg gta gaa gcg gga gaa cgt att
 Thr Asn Glu Ala Leu Asn Val Thr Leu Val Glu Ala Gly Glu Arg Ile
 205 210 215 220
 ttg cct gcg tta ccg cca cgt atc tct gct gcg gcc cac aac gag cta
 Leu Pro Ala Leu Pro Pro Arg Ile Ser Ala Ala Ala His Asn Glu Leu
 225 230 235
 acg aaa ctt ggc gtt cgc gtg ctg acg caa acc atg gtc acc agt gct
 Thr Lys Leu Gly Val Arg Val Leu Thr Gln Thr Met Val Thr Ser Ala
 240 245 250
 gat gaa ggc ggc ctg cac act aaa gat ggc gaa tat att gag gct gat
 Asp Glu Gly Gly Leu His Thr Lys Asp Gly Glu Tyr Ile Glu Ala Asp
 255 260 265
 ctg atg gta tgg gca gcc ggg atc aaa gcg cca gac ttc ctg aaa gat
 Leu Met Val Trp Ala Ala Gly Ile Lys Ala Pro Asp Phe Leu Lys Asp
 270 275 280
 atc ggt ggt ctt gaa act aac cgt atc aac cag ctg gtg gtg gaa ccg
 Ile Gly Gly Leu Glu Thr Asn Arg Ile Asn Gln Leu Val Val Glu Pro
 285 290 295 300
 acg ctg caa acc acc cgc gat cca gac att tac gct att ggc gac tgc
 Thr Leu Gln Thr Thr Arg Asp Pro Asp Ile Tyr Ala Ile Gly Asp Cys
 305 310 315
 gcg tca tgc ccg cgt ccg gaa ggg ggc ttt gtt ccg ccg cgt gct cag
 Ala Ser Cys Pro Arg Pro Glu Gly Gly Phe Val Pro Pro Arg Ala Gln
 320 325 330
 gct gca cac cag atg gcg act tgc gca atg aac aac att ctg gcg cag
 Ala Ala His Gln Met Ala Thr Cys Ala Met Asn Asn Ile Leu Ala Gln
 335 340 345
 atg aac ggt aag ccg ctg aaa aat tat cag tat aaa gat cat ggt tgc
 Met Asn Gly Lys Pro Leu Lys Asn Tyr Gln Tyr Lys Asp His Gly Ser
 350 355 360
 ctg gta tgc ctg tgc aac ttc tcc acc gtc ggt agc ctg atg ggt aac
 Leu Val Ser Leu Ser Asn Phe Ser Thr Val Gly Ser Leu Met Gly Asn
 365 370 375 380
 ctg acg cgc ggc tca atg atg att gaa gga cga att gcg cgc ttt gta
 Leu Thr Arg Gly Ser Met Met Ile Glu Gly Arg Ile Ala Arg Phe Val
 385 390 395

111

aactcgccca gcagacgctg ctcacccgct ttgacgggca gcgataacg atattgttca 12271
 ggcataacgg ttgtcagatt ctcgttagga tatgcctcaa catatggggg catatctctg 12331
 ataagcaatg ctgttcatta tccgtaatcg acatgggt 12368

<210> 84
 <211> 434
 <212> PRT
 <213> Escherichia coli

<400> 84
 Leu Thr Thr Pro Leu Lys Lys Ile Val Ile Val Gly Gly Gly Ala Gly
 1 5 10 15
 Gly Leu Glu Met Ala Thr Gln Leu Gly His Lys Leu Gly Arg Lys Lys
 20 25 30
 Lys Ala Lys Ile Thr Leu Val Asp Arg Asn His Ser His Leu Trp Lys
 35 40 45
 Pro Leu Leu His Glu Val Ala Thr Gly Ser Leu Asp Glu Gly Val Asp
 50 55 60
 Ala Leu Ser Tyr Leu Ala His Ala Arg Asn His Gly Phe Gln Phe Gln
 65 70 75 80
 Leu Gly Ser Val Ile Asp Ile Asp Arg Glu Ala Lys Thr Ile Thr Ile
 85 90 95
 Ala Glu Leu Arg Asp Glu Lys Gly Glu Leu Leu Val Pro Glu Arg Lys
 100 105 110
 Ile Ala Tyr Asp Thr Leu Val Met Ala Leu Gly Ser Thr Ser Asn Asp
 115 120 125
 Phe Asn Thr Pro Gly Val Lys Glu Asn Cys Ile Phe Leu Asp Asn Pro
 130 135 140
 His Gln Ala Arg Arg Phe His Gln Glu Met Leu Asn Leu Phe Leu Lys
 145 150 155 160
 Tyr Ser Ala Asn Leu Gly Ala Asn Gly Lys Val Asn Ile Ala Ile Val
 165 170 175
 Gly Gly Gly Ala Thr Gly Val Glu Leu Ser Ala Glu Leu His Asn Ala
 180 185 190
 Val Lys Gln Leu His Ser Tyr Gly Tyr Lys Gly Leu Thr Asn Glu Ala
 195 200 205
 Leu Asn Val Thr Leu Val Glu Ala Gly Glu Arg Ile Leu Pro Ala Leu
 210 215 220
 Pro Pro Arg Ile Ser Ala Ala Ala His Asn Glu Leu Thr Lys Leu Gly

225		230		235		240
Val Arg Val	Leu Thr Gln Thr Met Val	Thr Ser Ala Asp Glu Gly Gly				
	245	250	255			
Leu His Thr	Lys Asp Gly Glu Tyr Ile	Glu Ala Asp Leu Met Val Trp				
	260	265	270			
Ala Ala Gly	Ile Lys Ala Pro Asp Phe	Leu Lys Asp Ile Gly Gly Leu				
	275	280	285			
Glu Thr Asn	Arg Ile Asn Gln Leu Val Val	Glu Pro Thr Leu Gln Thr				
	290	295	300			
Thr Arg Asp	Pro Asp Ile Tyr Ala Ile	Gly Asp Cys Ala Ser Cys Pro				
	305	310	315			320
Arg Pro Glu	Gly Gly Phe Val Pro Pro	Arg Ala Gln Ala Ala His Gln				
	325	330	335			
Met Ala Thr	Cys Ala Met Asn Asn Ile	Leu Ala Gln Met Asn Gly Lys				
	340	345	350			
Pro Leu Lys	Asn Tyr Gln Tyr Lys Asp	His Gly Ser Leu Val Ser Leu				
	355	360	365			
Ser Asn Phe	Ser Thr Val Gly Ser Leu Met	Gly Asn Leu Thr Arg Gly				
	370	375	380			
Ser Met Met	Ile Glu Gly Arg Ile Ala Arg	Phe Val Tyr Ile Ser Leu				
	385	390	395			400
Tyr Arg Met	His Gln Ile Ala Leu His	Gly Tyr Phe Lys Thr Gly Leu				
	405	410	415			
Met Met Leu	Val Gly Ser Ile Asn Arg	Val Ile Arg Pro Arg Leu Lys				
	420	425	430			

Leu His

<210> 85

<211> 11045

<212> DNA

<213> Escherichia coli

<400> 85

gaaatttggtg ttagttcaat aaaaacaatc agatgagact aatcatctct tcagcattag 60
 cgttatgaat gagtaatata aatcgataat accgccgctg ggatatcgcg tattttcacc 120
 cattgacaat gtttttggcg gtggcatgat gcgcatgaaa ttggaacttc ctcacgggtt 180
 taattcatgt ccacgtatac ccagcctgtc atgcttttgc tgtctggcct gcttttggtg 240
 actctggcga ttgcggtgtt aaatacactc gtgccgcttt ggctcgccca ggaacacatg 300

tccacatggc aggtaggcgt tgtcagctca tctatattta ccggcaacct tgtcgggtaca 360
 ttgctgacag ggtatgtcat taagcgcatt ggctttaacc gcagctatta tctggcctcc 420
 ttcatTTTTg ccgctggctg tgccggcctt ggctgatga ttggattctg gagctgggtg 480
 gcttggcgtt ttgtcgcggg cgtcggctgt gccatgattt gggtggttgt tgagagcgcg 540
 ctgatgtgca gtgggacgtc acgtaaccgt gggcgtttgc ttgctgcgta tatgatggtt 600
 tattacgtgg gaacgttttt aggccagtta ctggtcagca aagtttcaac cgagctgatg 660
 tccgtattgc cgtgggttac aggtttgacg ttggcaggga tcttaccgct gttgtttacg 720
 cgtgtgctga atcagcaggc tgaaaaccaa gattcgacgt caattacgtc aatgctaaaa 780
 ctccgtcagg cgcggcttgg cgtgaatggc tgcattatct caggaatcgt tctgggatct 840
 ctatatggcc tgatgccgct gtacctcaat cacaaggggg tgagcaatgc cagcattggt 900
 ttctggatgg cggtagctgt cagtgcgggt atccttgac aatggccgat tggacgtctg 960
 ggggataagt ttggtcgact gctggtgttg cgtgttcagg tctttgtcgt cattctcggc 1020
 agtatcgca tgetttagca ggccggcgatg gcccagcgt tattcatcct cggtgccgct 1080
 ggctttacgc tatatccggt ggcgatggca tgggcttgcg agaaagtga acatcatcaa 1140
 ctggtggcga tgaaccaggc ctactgttg agctatactg tgggaagtct gcttgggccg 1200
 tcatttaccg ctatgcta at gcagaatttc tccgataatt tattgtttat catgatcgcc 1260
 agcgtatcgt ttatctattt gctgatgctg ctgcgcaacg ccggtcatac gccgaaacct 1320
 gttgctcacg tgtaaatgaa ttcaagcaga gtgtgaactt actgtttcac actctgcttt 1380
 ttgttttctt ctatctgact tgcctttatc caaattttat tctgtttaaa ataaaatgtg 1440
 cagcaggtta taattttgca ttctgctatt tccgcacttc ttatttgccg cgcataatcc 1500
 ctggttttac cgatgccctt ttaattttgg cgaaggattt gtctatggct gggaatgttc 1560
 aggaaaaaca gttgcgatgg tacaacattg cgtgatgtc ttttatcact gtctggggtt 1620
 ttggcaacgt tgttaataac tatgccaaac aggggctggg ggttggtttt tcatgggtgt 1680
 ttatctttgc actctatttc acaccttatg cgctaattgt tggtcagtta ggctcgacct 1740
 tcaaagatgg gaagggcggg gtcagtacct ggattaaaca cacgatggga ccgggactgg 1800
 ctatctctgc cgcgtggacc tactgggttg tgcataattc ctatctggca caaaaacccc 1860
 aggcaattct gattgcgtc ggttgggcga tgaaaggcga cggttcgcta atcaaagaat 1920
 attcagtcgt agcgttacag gggttaacgc tggtgctgtt tatcttcttt atgtggggtg 1980
 cttoacgcgg tatgaaatcg ctgaaaatcg tgggttctgt ggcagggatt gctatgtttg 2040

cggggtgtcc gattgaataa gogaatttta agacgttggt ccagtgtttt aatactatgg 3780
 ctaatggcgg acgaggataa gcctaactca tcgcccgctg cacgaaagct ttgattacgg 3840
 gccacggcaa agaaagtggc aaagtcagac atattcatcc gcattagtga aaatccttca 3900
 ttaactcatc ctgaatcatc acgtttacag gattatgccg cctgcgtaaa gtgcgctcca 3960
 gaacttaacg tggaggtaaa attatgcagt ctgaacgtat ttatttggtt tggggccatc 4020
 ctcgatcatg ttcatcgacc gcacatattg ctgatgcgat ccatcagcgg gcaatggagc 4080
 ggaaaataca ggtgacggaa ctcgatttat atcggcgtaa tttcaaccca gtgatgacgc 4140
 cggaagatga accagactgg aagaatatgg ataaacgtta ttctccagag gttcatcagc 4200
 ttatttcaga gctgcttgaa catgacacgt tagtggtggt ttttcctctc tgggtgtaca 4260
 gcttcccgcc aatgctaaaa ggatatattg acagagtatg gaataatggg ctggcttatg 4320
 gagatgggca caaattacca ttcaataaag ttcgttgggt ggcgctgggt ggaggagaca 4380
 aagaatcatt tgtccagatg ggctgggaaa aaaatataag cgattattta aaaaatatgt 4440
 gcagttatct tggatttgaa gatgccgatg tcactttctt gtgtaataca gtggtattcg 4500
 atggggaaga acttcacgcg agctattatc agtcgttatt atctcaggta cgggatatgg 4560
 tagatgcact acaagatgtg ttaaaaacgc tgtagcagaa tgaagcgcgg aataaaaaag 4620
 cggcaactca ataaagttgc cgctttacgg ggaaattaga acattacctt atgaccgtac 4680
 tgctcaagaa tgcctttcac gcgttccatg gtctctttct tcggtgggtt aacaccgtcg 4740
 agtttgtact cttcaccatc tgcaccatc ttgtgtttgc ccagctcgtg gtaggggaga 4800
 agctcgattt tctcaacgtt gccatatca cgggtaaatt caccgaggcg atgcgctgaa 4860
 tcgtcatcgt cagaccagcc tgggacaaca acgtagcgga tccacacctt cacatttttg 4920
 ttccgcagat atttagcgaa ctccagcgtg cggtggttgg aaactccaac cagatttttg 4980
 tggatctcgt cgttcactctg tttgagatcg agcattacca ggtcggttac ttccagcagt 5040
 tcatcaatca ccggatcgta acgaogaaca aaaccgttgg tgtccagaca ggtatgaatg 5100
 ccttcttttt tgcaggcgcg gaaccagtca cgaacaaact cagcttgacg gattgcttca 5160
 ccgccgatg cggtaacgcc gccgcgggaa gcgttcataa agtggcgata ggtcaccact 5220
 tccttcatca aatcttcaac ggtaacttct ttaccgcat gcgtgtccca ggtgtcgcgg 5280
 ttatgacaat acaggcagcg catcaggcag ccctggaaaa aggtgataaa gcgaatacct 5340
 gggccgtcta cggttcaca ggattcaaag gagtgaatgc gaccaataac tgacattgcg 5400
 gtgtttctcc agatgtggcc catctgaggc cgtgttgggt cgcagctcga aggctacgtc 5460

cgtagccgta tttcgcagcc atttctttca tctgaccag agcgcggtgc tgttcagcga 7200
 tttcttcgcy cagacggata gtctgttcca ggtttacgcc gttttccaga tcagcctgca 7260
 gagaagtga cgtgtccagt ttgtctttca tcaggtagtc gataccgtac agcgcaacgc 7320
 gacggtagtc accgatgata cggccacggc catatgcac tggcagaccg gtcagaacac 7380
 cagatttacg gcaacgcagg atgtccggag tgtaaacgtc gaacacgccc tggttgtgag 7440
 ttttacggta ttcagtgaag atttttttga tcatcgatc cagttcgcgg ttgtacgctt 7500
 tgcaggaacc ttogatcatt ttgataccac cgaacgggat aagagcacgt ttcagcggag 7560
 cttcagtctg cagaccaacg attttctcaa gctgcttgtt gatgtagcca gcgtcgtgag 7620
 aggtgatggg ggaagcaaca gcggtgtcaa agtcaactgg cgcgtgagtg cggttttcca 7680
 gtttaacgcc ttccattact ttgtcccaca ggggtggtgt cgttcagta gcgccagcca 7740
 ggaaggactc gtcacctcg tacggagtgt agtttttctg aatgaagtca cggacgttta 7800
 cttcattctg ccagtcacct ttggtaaaac cttcccaggc tgtggctaac ttttcattaa 7860
 gctcggacat gtaaacacta cttctttaag tggatttttt atttactgcg tacttcgaca 7920
 accattaatg gtggtcgttt tcacgcaggt aaatgaccca gtatgtcaac ccaaccaaca 7980
 aaccaccacc gataatgttg ccgatcgtaa ccggaatcag gttatcagtg atgaaattca 8040
 tcacggtcag gtgagaaaaa ttttccggtg cagaaccgac tgcggtccaa aattccgggg 8100
 atgcgaagtc gcggattaca ataccatcg ggatcataaa catgtttgcg atactgtgct 8160
 caaaaccgct ggcaacaaac atcgcgaccg gcagcaccat aatgaacgct ttgtccatca 8220
 ggctgcggcc agaataactc atccatactg ccagacatac catcaggttt gccaggatac 8280
 caagacagac ggctcaata aaagtatggt gcactttgtg gtcggcggtt tgtaggacgt 8340
 ttagtcccca ttgaccattt gcggtcatat actcgccgga aagccacatt aaaagtacaa 8400
 acagcagtgc gccgaccagg ttgccaaaat agacatttag ccagtttttc gccaaactgac 8460
 cccaggtgat gcgcccactc gccttagcaa caacaatcaa cacggtggaa gtaaagagat 8520
 cggctccgca gacaacacaa agaatcagcc ccagagagaa gcaaagccg ccaaccagtt 8580
 ttgcatgcc gaagggcatt gtgcctgtgc cagtgggtgc tgtgatatag aagacgaatg 8640
 cgattgagat gaaaacaccg gcggtaatcg ccagatagaa agtcttaagc ggatgtttcg 8700
 ttgctttata gacaccgcc tcttcggcca ctttggccat tgcagcagga agtaaaagat 8760
 caaaagggtt gtcagctttc aactaactc tctctttatt aagtcggcga cgagatacta 8820
 acaaagcatt atagatgaga aattgatata gatcatatct cgcctggctt ataggcccg 8880

5' -> 3'
 3' -> 5'

aaaacgcgcg cagacgggtca tcgagcagcc cttctggcac atcgtcattt tcggtcagtg 10620
 ggaaccattt ttcgttggga taatgcacga acggaccgtt ggcgatgggt tcgcccagcc 10680
 agaagtcgcg aaaaaagtag ttggttgaga gacgctcgaa atattcaccg agtgcagaag 10740
 ccagcgccgc tttcttggtt gcgcctttac cgttggtaaa acacagtgcg cactctttgt 10800
 cgcgaatatg tacagaccag acgttaggca cgggattcag ccaggaggcc tcttcaatct 10860
 gaaagccgag gcttgaaagt ttttgctgga agcgagcgat ggaatcttcc agagcggcat 10920
 ctttgccggg gataaatgtt tgcgtcatga aaatcacttt agtcgtacgg aaagcgcgca 10980
 ataatacggg ttttatctca aaggcgctat caccgccgcc atgccgatga actgttgact 11040
 atgct 11045

<210> 86

<211> 760

<212> PRT

<213> Escherichia coli

<400> 86

Met Ser Glu Leu Asn Glu Lys Leu Ala Thr Ala Trp Glu Gly Phe Thr
 1 5 10 15

Lys Gly Asp Trp Gln Asn Glu Val Asn Val Arg Asp Phe Ile Gln Lys
 20 25 30

Asn Tyr Thr Pro Tyr Glu Gly Asp Glu Ser Phe Leu Ala Gly Ala Thr
 35 40 45

Glu Ala Thr Thr Thr Leu Trp Asp Lys Val Met Glu Gly Val Lys Leu
 50 55 60

Glu Asn Arg Thr His Ala Pro Val Asp Phe Asp Thr Ala Val Ala Ser
 65 70 75 80

Thr Ile Thr Ser His Asp Ala Gly Tyr Ile Asn Lys Gln Leu Glu Lys
 85 90 95

Ile Val Gly Leu Gln Thr Glu Ala Pro Leu Lys Arg Ala Leu Ile Pro
 100 105 110

Phe Gly Gly Ile Lys Met Ile Glu Gly Ser Cys Lys Ala Tyr Asn Arg
 115 120 125

Glu Leu Asp Pro Met Ile Lys Lys Ile Phe Thr Glu Tyr Arg Lys Thr
 130 135 140

His Asn Gln Gly Val Phe Asp Val Tyr Thr Pro Asp Ile Leu Arg Cys
 145 150 155 160

Arg Lys Ser Gly Val Leu Thr Gly Leu Pro Asp Ala Tyr Gly Arg Gly
 165 170 175

Arg Ile Ile Gly Asp Tyr Arg Arg Val Ala Leu Tyr Gly Ile Asp Tyr
 180 185 190
 Leu Met Lys Asp Lys Leu Ala Gln Phe Thr Ser Leu Gln Ala Asp Leu
 195 200 205
 Glu Asn Gly Val Asn Leu Glu Gln Thr Ile Arg Leu Arg Glu Glu Ile
 210 215 220
 Ala Glu Gln His Arg Ala Leu Gly Gln Met Lys Glu Met Ala Ala Lys
 225 230 235 240
 Tyr Gly Tyr Asp Ile Ser Gly Pro Ala Thr Asn Ala Gln Glu Ala Ile
 245 250 255
 Gln Trp Thr Tyr Phe Gly Tyr Leu Ala Ala Val Lys Ser Gln Asn Gly
 260 265 270
 Ala Ala Met Ser Phe Gly Arg Thr Ser Thr Phe Leu Asp Val Tyr Ile
 275 280 285
 Glu Arg Asp Leu Lys Ala Gly Lys Ile Thr Glu Gln Glu Ala Gln Glu
 290 295 300
 Met Val Asp His Leu Val Met Lys Leu Arg Met Val Arg Phe Leu Arg
 305 310 315 320
 Thr Pro Glu Tyr Asp Glu Leu Phe Ser Gly Asp Pro Ile Trp Ala Thr
 325 330 335
 Glu Ser Ile Gly Gly Met Gly Leu Asp Gly Arg Thr Leu Val Thr Lys
 340 345 350
 Asn Ser Phe Arg Phe Leu Asn Thr Leu Tyr Thr Met Gly Pro Ser Pro
 355 360 365
 Glu Pro Asn Met Thr Ile Leu Trp Ser Glu Lys Leu Pro Leu Asn Phe
 370 375 380
 Lys Lys Phe Ala Ala Lys Val Ser Ile Asp Thr Ser Ser Leu Gln Tyr
 385 390 395 400
 Glu Asn Asp Asp Leu Met Arg Pro Asp Phe Asn Asn Asp Asp Tyr Ala
 405 410 415
 Ile Ala Cys Cys Val Ser Pro Met Ile Val Gly Lys Gln Met Gln Phe
 420 425 430
 Phe Gly Ala Arg Ala Asn Leu Ala Lys Thr Met Leu Tyr Ala Ile Asn
 435 440 445
 Gly Gly Val Asp Glu Lys Leu Lys Met Gln Val Gly Pro Lys Ser Glu
 450 455 460
 Pro Ile Lys Gly Asp Val Leu Asn Tyr Asp Glu Val Met Glu Arg Met
 465 470 475 480

Asp His Phe Met Asp Trp Leu Ala Lys Gln Tyr Ile Thr Ala Leu Asn
 485 490 495
 Ile Ile His Tyr Met His Asp Lys Tyr Ser Tyr Glu Ala Ser Leu Met
 500 505 510
 Ala Leu His Asp Arg Asp Val Ile Arg Thr Met Ala Cys Gly Ile Ala
 515 520 525
 Gly Leu Ser Val Ala Ala Asp Ser Leu Ser Ala Ile Lys Tyr Ala Lys
 530 535 540
 Val Lys Pro Ile Arg Asp Glu Asp Gly Leu Ala Ile Asp Phe Glu Ile
 545 550 555 560
 Glu Gly Glu Tyr Pro Gln Phe Gly Asn Asn Asp Pro Arg Val Asp Asp
 565 570 575
 Leu Ala Val Asp Leu Val Glu Arg Phe Met Lys Lys Ile Gln Lys Leu
 580 585 590
 His Thr Tyr Arg Asp Ala Ile Pro Thr Gln Ser Val Leu Thr Ile Thr
 595 600 605
 Ser Asn Val Val Tyr Gly Lys Lys Thr Gly Asn Thr Pro Asp Gly Arg
 610 615 620
 Arg Ala Gly Ala Pro Phe Gly Pro Gly Ala Asn Pro Met His Gly Arg
 625 630 635 640
 Asp Gln Lys Gly Ala Val Ala Ser Leu Thr Ser Val Ala Lys Leu Pro
 645 650 655
 Phe Ala Tyr Ala Lys Asp Gly Ile Ser Tyr Thr Phe Ser Ile Val Pro
 660 665 670
 Asn Ala Leu Gly Lys Asp Asp Glu Val Arg Lys Thr Asn Leu Ala Gly
 675 680 685
 Leu Met Asp Gly Tyr Phe His His Glu Ala Ser Ile Glu Gly Gly Gln
 690 695 700
 His Leu Asn Val Asn Val Met Asn Arg Glu Met Leu Leu Asp Ala Met
 705 710 715 720
 Glu Asn Pro Glu Lys Tyr Pro Gln Leu Thr Ile Arg Val Ser Gly Tyr
 725 730 735
 Ala Val Arg Phe Asn Ser Leu Thr Lys Glu Gln Gln Gln Asp Val Ile
 740 745 750
 Thr Arg Thr Phe Thr Gln Ser Met
 755 760

<211> 14759

<212> DNA

<213> Escherichia coli

<400> 87

gcagcccccg tcaactgctgg gggtgagtc tcttgacgtc tgctttacgg gcggttaagg 60

tgectcttgt gcgccagaag tgcatataaa cgataacatt gacctgtaga cttgattatc 120

atggacaaat tcgacgctaa tcgccgcaaa ttgctggcgc ttggtggcgt tgcaactcgg 180

gccgccatcc tgccgacccc tcggtttgca acactctcta ccccaagccc gcgcattttg 240

acactcaata atcttcatac cggagagtc atcaaagcgg agtttttcga tggcagaggc 300

tatattcagg aagaattggc aaaacttaac cttttttcc gcgattaccg cggaacaaa 360

ataaagtcca tcgaccagg attattcgac cagttgtatc gcctgcaagg gttgttaggc 420

acgcgcaaac cggtgcaact catttcgggt tatcgttcta ttgataccaa caatgaacta 480

cgccccgca gccgtggagt agcgaagaaa agctatcaca ctaaaggcca ggcatggat 540

ttccatattg aaggtatcgc gttaagcaat attcgcaaag ccgcgttato tatgcgcga 600

ggtggtgtag gatattatcc acgtagtaac tttgtgcata ttgataccgg gccagcacgg 660

cactggtagt aattgcttaa cgaaacaggg gcagtatgaa ctatcgtatt attccgggtc 720

ccgcattctc ccagaactgt tcattaatct ggtgtgaaca aaccogtctg gccgcactgg 780

tcgatcctgg cggcgatgcg gaaaaaatca aacaggaagt tgatgacagc ggctgacac 840

tgatgcagat cctgctgacg catggtcatc tggaccacgt tggcgcagcg gcggaactgg 900

cgcaacatta cggcgtgccg gttttcggcc cggaaaaaga agatgagttc tggctgcaag 960

gcttgctgc gcaaagtcgt atgtttggtc tggaagagtg ccagccgctg acgccagatc 1020

gttggtgaa cgaaggcgt accatcagca tagggaatgt gactttacag gtgttacatt 1080

gccctgggca tacgccgggt catgtcgtgt tttttgatga tcgggcaaag ctgctgattt 1140

ctggcgatgt tttttcaaa ggccgagtag ggccgagtga cttcccgcgt ggcatcata 1200

atcaactgat ttcttcaatc aaagataaat tgctgccact gggggatgac gtgatattta 1260

ttccgggtca cggaccatta tccacacttg gttatgaacg cctgcataat cccttcctgc 1320

aagacgaaat gccgctctgg taaggcacat aaaaaagccc gcttttaatg ctggcctgga 1380

tttctggcaa agtgcgcttt gtttatgccg gatgcggcac gagcgctta tccggcctac 1440

aaaatcgtgc aaattcaaaa tattgcaggg gacgcgtagg cctgataagc gtagcgcac 1500

aggcaatgtt gcgtttgtca tcagtctcag cccgcttttc agcgggcttc attgttttta 1560

gagcgcgcaaac cggtgcaact catttcgggt tatcgttcta ttgataccaa caatgaacta 480

cgccccgca gccgtggagt agcgaagaaa agctatcaca ctaaaggcca ggcatggat 540

ttccatattg aaggtatcgc gttaagcaat attcgcaaag ccgcgttato tatgcgcga 600

ggtggtgtag gatattatcc acgtagtaac tttgtgcata ttgataccgg gccagcacgg 660

cactggtagt aattgcttaa cgaaacaggg gcagtatgaa ctatcgtatt attccgggtc 720

ccgcattctc ccagaactgt tcattaatct ggtgtgaaca aaccogtctg gccgcactgg 780

tcgatcctgg cggcgatgcg gaaaaaatca aacaggaagt tgatgacagc ggctgacac 840

tgatgcagat cctgctgacg catggtcatc tggaccacgt tggcgcagcg gcggaactgg 900

cgcaacatta cggcgtgccg gttttcggcc cggaaaaaga agatgagttc tggctgcaag 960

gcttgctgc gcaaagtcgt atgtttggtc tggaagagtg ccagccgctg acgccagatc 1020

gttggtgaa cgaaggcgt accatcagca tagggaatgt gactttacag gtgttacatt 1080

gccctgggca tacgccgggt catgtcgtgt tttttgatga tcgggcaaag ctgctgattt 1140

ctggcgatgt tttttcaaa ggccgagtag ggccgagtga cttcccgcgt ggcatcata 1200

atcaactgat ttcttcaatc aaagataaat tgctgccact gggggatgac gtgatattta 1260

ttccgggtca cggaccatta tccacacttg gttatgaacg cctgcataat cccttcctgc 1320

aagacgaaat gccgctctgg taaggcacat aaaaaagccc gcttttaatg ctggcctgga 1380

tttctggcaa agtgcgcttt gtttatgccg gatgcggcac gagcgctta tccggcctac 1440

aaaatcgtgc aaattcaaaa tattgcaggg gacgcgtagg cctgataagc gtagcgcac 1500

aggcaatgtt gcgtttgtca tcagtctcag cccgcttttc agcgggcttc attgttttta 1560

tcgtacttca gaccagtagc ccaactgttca gcttttttac cgttgccaag aggttgagct 3360
 tottgacagg tggtaagggtc agctgcacca taagcaccaa cgataccaaa gccttcgtat 3420
 tcgtagctga tagaaccgcc aacaccgtcg ccgttagaac ggcgtgcagt gtcacgctcg 3480
 tttttacca ggtactgaac agcgaagttc aggccatcaa ccagacccaaa gaagttggag 3540
 ttacgatagg tagcaacgcc gccaacacga ccaacgaaga agtcacgct gtatgcagta 3600
 tcaccaccaa attctggcag catatcgggtg taaccacgtg catcataaac cacaccgtag 3660
 ttacggccgt aatcgaaaaga accaacgtca gcgatattta gaccgcgaa tgccagacgc 3720
 gttttgttac cagtttgagc gtcagcgct tcagagttgt taccctggaa gttatattcc 3780
 cactgacat aaccggtcag atcggaattg atttgagttt cccctttaaa accaagacgg 3840
 gcataggta tgcgccatt gccaccgtaa ctgttttcac cgttaccctt ggaaaaataa 3900
 tgcagaccaa cagctttacc gtacagatct actttgttg catctttgt atagatttct 3960
 gcagcggttg cagtacctgc tactaacaga gcagggacga tcaactgccag aatattgcgc 4020
 ttcattatta tttattacc tcattggttt tttatgaca cctgccactg ccgtcaataa 4080
 gttctgtcaa taaaaattta cggaactatt gatgagagtt tgggtgtctt atgtgtctgc 4140
 aggcattctt ccattcaaac taacgtttcg ctaccgtgaa agtgctacaa agataaagat 4200
 ttggtttcaa aaagaaaaaa tatgtaacca aaagtaaaat ttaaggaact ttgtgaacac 4260
 cgtcatattt ccatagagac gtgatgatat ttacagcaat ttaattctat ttatatgatt 4320
 tccttatatt taaattaact aaacggaaat tttgtttctg atggaaactt tatcgacctg 4380
 gcacaaaatc ttctttcaga catccagaat gccaaaaaat agtatgaaaa ttgtgctatt 4440
 agctaagaaa aaactaatcc gcaataagaa tgcggattag tttttgcgcg taaatggtgc 4500
 aatgtaatat tccgtaacag gatgatcgtt atggcggggt tgcaaataga ttgcttgact 4560
 taacaaacag ataacttgac agaaaagata aaaaagagc cagcgggagc tggctcttga 4620
 agacgctaaa ttagaagctg gcgttacgcg gagtacgtgg gaacggaatc acatcacgta 4680
 cgttttgac gccagttacg taagcaatca gacgttcaaa accaagaccg aaacctgaat 4740
 gcggaacagt accgtagoga cgcagatcgc gataccacca gtaattctt ttattcaggc 4800
 ccatttccag catacgtcg tccagcacgt ccagacgttc ttcacgctgg gagccaccaa 4860
 tgatctcacc gatgccgga gccagaacgt ccatagccgc aacggtttta ccgtcttcgt 4920
 taaggcgcat atagaacgct ttaatatctt tcggatagtt ttaaccact accggtgctt 4980

ccaccggttaa aaaccagggg gcaacgcgca ataaccactt cttcactggc gttgccatta 11880
 tttcttcottt agcttttgcgc gacttttacgg gggataaaat cattcgccac cgcttcgcct 11940
 tgccgattca ggggctgogg ctggggaatt tccgggatgg cgacatccag aagcggaac 12000
 agcaactcgc caaccgata cgcttcttcc agatgcggat agcccgaaag cacaaaactg 12060
 tcgatgccaa ggcgggcata ttctgttatt cgcgcagcga ccgtaggacc atcgcccacc 12120
 agcgccgtcc cggcaccgcc gcgcactaag ccaacgcccg ccataaatt ggggctgac 12180
 tccagattgt cgcgcttgcc gttatgtaac gcgcgcatte gctgttgccc tacggaatcc 12240
 gtccgggcca atgcggcctg tgctttggcg atagtttcat catcaagatg cgagattaac 12300
 cgctcggcgg cctgccacgc ttctgtgta gtttcacgaa caatcacatg cagacgaata 12360
 ccgaaacgaa ttttgcgtcc atgcgoggca gctttcgccc gcacttgctt gattttctct 12420
 ttaaccagtt ccggcggttc gcccagggtg aggtagagat caacctgttc tgccgccagc 12480
 tcctgggcca catctgacga tccgcaaaag taaagtggcg gatacggctg ttgaatcgcc 12540
 gggaagagca gttttgctcc gcgcacatga atatgtttac cgttgaaatc gacggtttct 12600
 ctctgcaata aacgccgcca gacctgggta aattccgccg aggttcgta gcgctcgcta 12660
 tgatcaagga aactccgtc gcctgccagc tcttgtggat cgctgcctgt gaccaggtta 12720
 aacaacgcac gtccatttga gagacggtca agcgtggcgg cctggcgggc ggcaacggta 12780
 ggtgaggtta cgctgggacg cagggcgaca agaaacttca gccgctgcgt caccgggac 12840
 atcgatggcg caaccagcca cgcattctcg caggagcgcc ccgttggaat tagcacaccg 12900
 gtatagccaa gacgatccgc cgcttgcgca atttgttga gataaccgtg atcaaccggg 12960
 cgtgaacctt cttccgttcc cagataatgc ccgtcacctg gggtcggttaa aaaccagaac 13020
 atattcagac tcataattgt tttccttcca gttgagtggg ctgccagatg cgctggcgaa 13080
 tatcgacttt tttcggaacc agacgatttt cataaaacag atctgccgtt tgctgctgta 13140
 aggcggcaac ctcggcgtta accggtttga tggtagtagg agggcgatga tctaagtaag 13200
 aggcaatcac cggtgccggt aagcccatcg tttttgccag taaagcgatg ctttgcctgc 13260
 gctggctgcg ggtaacgca tcggcctcac taaaggttgc cagtacgcc tgaataaaag 13320
 cgccgttttt ttctgcatag ggacgagctg ccagataaaa cgatccagtt tgattgagat 13380
 cggtgccgtc tttcagcacc cgcaogccgc cctgtaataa tgcagcagag tagtagggat 13440
 ccagatagc ccaggcgta acgttacctt gctggaacgc ggcgcgggca tcagcgggcg 13500
 tcaggtaagt gggttggata tcggtaaact taagtccggc ctgacgcagt gcacgcagta 13560

aaaggttggtg tgaactggaa cctttctgaa aggcaacttt gtgaccttta agatcggcta 13620
 cggttttgat cgggctgttt tctgccacca gaatcacttc ggctttgggc ttcggtggct 13680
 cgacgcccac gtacaccaaa tcagccccgg cagcctgggc aaagattggc ggaatatccc 13740
 cgggtactgcc gagatcaata ctgccaacgt ttaacgcttc caacatttgc ggacccgcgg 13800
 ggaactccac ccaggagatt tttgattccg gatagcggtt ttccagtaac tgggtggcttt 13860
 ttgccagcac cataccaata ctgcctttct gatagcctat acgtaacgct tcaggcgagg 13920
 attctgcagc aaccgcaaaa gtagagacgc taagcaatcc cgccagcgcc agtttaatga 13980
 tgttacgcat gggcattacc tcgcagagac agaaggtcag gaacctgaac atcgcggcgg 14040
 tgcaatgcct gccagaaagt ttctagcgcg gtatcaagac gggtttgagc atttggcgtg 14100
 aactggggtc tgtgatggta atcaattact tgtgagtcac cggcaaacac gccgtgcagg 14160
 atctcctgag ctttcagtgc gcttaaaact ggtttaaggc cataatcgac cgccagcaga 14220
 tgggccaagg taccgcccgt cgccagcggc agcaccactt tgccttgcaa agcgcgcttct 14280
 ggcagcaggc cgagcagggt tttcaacgca ccggaatagg cggctttata cacaggcgtg 14340
 gcgacaatca gcccatcggc ctggtgcagc tgttcggtga aggtcttgag tgccggacta 14400
 tcgaaacgag cataaagtag atcttccggg gcgaagtttt gcagattcca gtgataaacc 14460
 totacatcca ggccatttag tttttccgcg gcatattcca gcaaggagct ggagcgagaa 14520
 ggaaagcgag gactaccgcg caggggtgat acacgcatac tctctcctta taaccaattg 14580
 ttcttttttt gtttaacattg ataacaattc ggtcagtcgt tcggagagac aagaaaattc 14640
 caaatataaa ttttgtgtat ctttttctga aaataaacta aagaaagggc tttatatatc 14700
 acgcatatth atttattgga tagtcattag atgttgaatc aatgaattac tcgttcagt 14759

<210> 88

<211> 432

<212> PRT

<213> Escherichia coli

<220>

<223> complement of position 371-1669 of seq id 87

<400> 88

Met	Gly	Asn	Asn	Val	Val	Val	Leu	Gly	Thr	Gln	Trp	Gly	Asp	Glu	Gly
1				5					10					15	

Lys	Gly	Lys	Ile	Val	Asp	Leu	Leu	Thr	Glu	Arg	Ala	Lys	Tyr	Val	Val
			20					25					30		

Arg Tyr Gln Gly Gly His Asn Ala Gly His Thr Leu Val Ile Asn Gly
 35 40 45
 Glu Lys Thr Val Leu His Leu Ile Pro Ser Gly Ile Leu Arg Glu Asn
 50 55 60
 Val Thr Ser Ile Ile Gly Asn Gly Val Val Leu Ser Pro Ala Ala Leu
 65 70 75 80
 Met Lys Glu Met Lys Glu Leu Glu Asp Arg Gly Ile Pro Val Arg Glu
 85 90 95
 Arg Leu Leu Leu Ser Glu Ala Cys Pro Leu Ile Leu Asp Tyr His Val
 100 105 110
 Ala Leu Asp Asn Ala Arg Glu Lys Ala Arg Gly Ala Lys Ala Ile Gly
 115 120 125
 Thr Thr Gly Arg Gly Ile Gly Pro Ala Tyr Glu Asp Lys Val Ala Arg
 130 135 140
 Arg Gly Leu Arg Val Gly Asp Leu Phe Asp Lys Glu Thr Phe Ala Glu
 145 150 155 160
 Lys Leu Lys Glu Val Met Glu Tyr His Asn Phe Gln Leu Val Asn Tyr
 165 170 175
 Tyr Lys Ala Glu Ala Val Asp Tyr Gln Lys Val Leu Asp Asp Thr Met
 180 185 190
 Ala Val Ala Asp Ile Leu Thr Ser Met Val Val Asp Val Ser Asp Leu
 195 200 205
 Leu Asp Gln Ala Arg Gln Arg Gly Asp Phe Val Met Phe Glu Gly Ala
 210 215 220
 Gln Gly Thr Leu Leu Asp Ile Asp His Gly Thr Tyr Pro Tyr Val Thr
 225 230 235 240
 Ser Ser Asn Thr Thr Ala Gly Gly Val Ala Thr Gly Ser Gly Leu Gly
 245 250 255
 Pro Arg Tyr Val Asp Tyr Val Leu Gly Ile Leu Lys Ala Tyr Ser Thr
 260 265 270
 Arg Val Gly Ala Gly Pro Phe Pro Thr Glu Leu Phe Asp Glu Thr Gly
 275 280 285
 Glu Phe Leu Cys Lys Gln Gly Asn Glu Phe Gly Ala Thr Thr Gly Arg
 290 295 300
 Arg Arg Arg Thr Gly Trp Leu Asp Thr Val Ala Val Arg Arg Ala Val
 305 310 315 320
 Gln Leu Asn Ser Leu Ser Gly Phe Cys Leu Thr Lys Leu Asp Val Leu
 325 330 335

1000
 900
 800
 700
 600
 500
 400
 300
 200
 100
 0

Asp Gly Leu Lys Glu Val Lys Leu Cys Val Ala Tyr Arg Met Pro Asp
 340 345 350
 Gly Arg Glu Val Thr Thr Thr Pro Leu Ala Ala Asp Asp Trp Lys Gly
 355 360 365
 Val Glu Pro Ile Tyr Glu Thr Met Pro Gly Trp Ser Glu Ser Thr Phe
 370 375 380
 Gly Val Lys Asp Arg Ser Gly Leu Pro Gln Ala Ala Leu Asn Tyr Ile
 385 390 395 400
 Lys Arg Ile Glu Glu Leu Thr Gly Val Pro Ile Asp Ile Ile Ser Thr
 405 410 415
 Gly Pro Asp Arg Thr Glu Thr Met Ile Leu Arg Asp Pro Phe Asp Ala
 420 425 430

<210> 89

<211> 11756

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (3951)..(4853)

<400> 89

atgggctcca caaaatgggg acatcaaaga aaagcagtgg cactaattaa gactgatgcc 60
 ctgcggaaaa gttctgcggt tgtgcaaaaa aatttcattt tcagggcaac ttcagtttta 120
 tcctaatacct ggccatacca tgacgatgat tgtccttgcc agcgtcagca ggacgttggc 180
 gattgcatag gtgcccgcac agcccagcgc cgggatgtta ctgcgagctg tatcactgat 240
 gatctccatt gccggcgcgc aggtacgtgc gcccatcatt gcgccgaaca acagcgcgcg 300
 gttcattcgc aatacataag caccgaacaa gaaacagata accacgggca ccagactgac 360
 aatcaatccg gcaatcaaca tctgaccgcc aatcgcgccc aggccgttat taataccgct 420
 accggcgcgc agaccaacgc ctgccataaa caccatcaag ccgaactctt tcaccatgct 480
 taatgcaccc tgcggaatgt aaccgaaggt cgggtggtta gcacgcataa agcccagcat 540
 aattccggcg aataacaacc cggcagcggt ccccatgccg aaactgaatg tgctgaactg 600
 gaaggtgatc atcccgatca tcagcccaat aacaaagaag gcgcagaatg ccagcaggtc 660
 agtgacctgg ctgtgaatcg agataaagcc gatgcgatcg gcgatggttt ttacgcggcg 720
 ggcatcgccg ctgacttgta aaacgtcacc tttgttaagc acgacgttgt catctatcgg 780

gcgaggggctt gtcagacgat caggcgtcca gattttcttt cacccatgca gcaaaatcgg 2520
 tatagccgcc gataatgttg tgatcgacaa aaatctgcgg cacggtttct acgggtttac 2580
 ctgccttttg ttgtagatct tctttagtga tcccttcgcg acgaatatct acatactgat 2640
 actgaaaatc atcgcggttca ttgctcaatt tctcagccag atcttttgca cgcacacagt 2700
 aagggaacc cgaacgacca aaaataacgg ttgcatat ttctctctc atagatttat 2760
 gcctgtaatg atcacgctaa aatgtattcg ctgaaagtag gtttaacctg ttgcattaat 2820
 tgctaaaagc tataactgtt aaacacaata cagtgaaaag ttttagactg aaggctcact 2880
 ttgcagaggg aagcgtatgc gcgcgatcgg taaattgcct aaaggcgtgt tgatactgga 2940
 atttatcgga atgatgctac tggcgggtggc gctgctgtcg gtaagcgact ccctgtcgct 3000
 gcctgagcca ttttctcggc cagaagtga gattctgatg atttttctcg gtgttttgct 3060
 catgcttccc gctgcgggtgg tggttattct tcaggtggca aaacgtcttg cccacagct 3120
 gatgaaccgt ccaccgcaat attcacgttc agaaagagaa aaagataatg acgccaacca 3180
 ttgaacttat ttgtggccat cgctccattc gccatttcac tgatgaaccc atttccgaag 3240
 cgcagcgtga ggcgattatt aacagcgccc gtgcgacgtc cagttccagt tttttgcagt 3300
 gcagtagcat tattcgcat accgacaaag cgttacgtga agaactggtg acgctgaccg 3360
 gcgggcaaaa acacgtagcg caagcggcgg agttctgggt gttctgtgcc gactttaacc 3420
 gccatttaca gatctgtccg gatgctcagc tcggcctggc ggaacaactg ttgctcggtg 3480
 tcgttgatac ggcaatgatg gcgcagaatg cattaatcgc agcggaatcg ctgggattgg 3540
 gcgggggtata tatcggcggc ctgcgcaata atattgaagc ggtgacgaaa ctgcttaaatt 3600
 taccgagca tgttctgcgg ctgtttgggc tgtgccttgg ctggcctgcg gataatccgg 3660
 atcttaagcc gcgtttaccg gctccattt tgggtgcatga aaacagctat caaccgctgg 3720
 ataaaggcgc actggcgcag tatgacgagc aactggcgga atattacctc acccggtggca 3780
 gcaataatcg ccgggatacc tggagcgatc atatccgccg aacaatcatt aaagaaagcc 3840
 gccatattat tctggattat ttgcacaaac aggggttgggc gacgcgctaa aaccgccacg 3900
 tcgatgtatg atacgcgggc ttttgaccag gtctgacaga gaggtgcagg gtg aaa 3956
 Val Lys
 1
 att gcc ata ttg tcc cgg gat gga acg ctc tat tcg tgt aag cgg ctg 4004
 Ile Ala Ile Leu Ser Arg Asp Gly Thr Leu Tyr Ser Cys Lys Arg Leu
 5 10 15
 cgt gaa gcc gct ata cag cgc ggt cac ctg gtt gaa att ctt gat ccg 4052

19 20

245	250	255	
atg gag gtg aat gcg tcg ccg ggg ctg gaa gga	ata gaa aaa acc acc	4772	
Met Glu Val Asn Ala Ser Pro Gly Leu Glu Gly	Ile Glu Lys Thr Thr		
260	265	270	
ggg atc gac atc gcg ggt aaa atg atc cgc tgg	atc gaa cgc cac gct	4820	
Gly Ile Asp Ile Ala Gly Lys Met Ile Arg Trp	Ile Glu Arg His Ala		
275	280	285	290
acg aca gaa tat tgc ctg aaa acg ggt ggt tag	tcgcaatcac attactgac	4873	
Thr Thr Glu Tyr Cys Leu Lys Thr Gly Gly			
295	300		
atgggttttgc ctgogctttt tgcgtaagct gtgccggtct	ttttatcgaa agaggttgta	4933	
caaaattatg acatcgctgg tcgttcctgg tctggatacg	ctgcgtcaat ggctcgatga	4993	
cctgggggatg agtttttttg aatgtgataa ctgtcaggct	ctgcatctgc cccatatgca	5053	
gaatttcgac ggtgtctttg atgccaaaat cgatctgac	gataacacga tcctgttttc	5113	
tgccatggcg gaagtccgac cttcagccgt attgccgctg	gcggcggatt tatctgccat	5173	
caatgccagt tcgctgaccg tgaaagcatt tcttgatatg	caggatgata atctgccaaa	5233	
gctggtgggt tgcagctctt tatccgttat gcagggcgta	acctatgagc agtttgcatt	5293	
gttcgtgcgt cagagcgaag agcagatttc gatggtcatt	cttgaagcta atgccatca	5353	
actgctgtta ccgactgatg atgaagggca aaacaacgtt	accgaaaact atttcctcca	5413	
ctgataactc ctttcgagca cgcagtcgct ggtgcagtgg	ctgcgcgctg caaaattatc	5473	
tgctgtttttt aaccttttct taaagattat ttcacttctc	ttgtgtcgat ttggctttat	5533	
cacatagagc aaatatgcat aaaaatttgt taaataccgt	tttttaatcc gagctatagt	5593	
ctcaaaccct ggctaaagtt attcttgaga tgcttttata	tagcgagcag tgctggcccg	5653	
gagaaagtcc tctttttctta caccgcgcgc ataaaaata	tgacagttta ttgcatact	5713	
ttcagtgatga caacttttgt tcgtttgtta acgaactttc	agaaggaaag agatatgacc	5773	
gccttaaata aaaaatggct atcgggtctg gttgcgggtg	ctctgatggc cgtctctgtc	5833	
ggcacgctcg cggctgaaca aaaaacactc cacatttata	actggtctga ttatatcgcc	5893	
ccggacacgg tggccaattt tgaaaaagaa accggtatta	aagtcgtcta cgatgttttc	5953	
gactctaacg aagtactgga aggcaaatta atggccggga	gtaccggctt tgatctggtg	6013	
gttccatctg ccagctttct ggagcgccag ttgactgcgg	gagttttcca gccgctggac	6073	
aaaagcaaatt tgccggagtg gaagaatctc gaccgggaac	tgctgaagct ggtcgccaaa	6133	
cacgatcccg acaataaatt tgctatgcc tatatgtggg	cgacgaccgg gattggctat	6193	

aacgttgata aagttaaagc ggtgctgggc gaaaacgcgc ccgtcgatag ctgggacttg 6253
 atcctcaaac ctgaaaatct ggaaaaactg aaaagctgcg gtgtctcttt cctggatgcg 6313
 ccagaagaag tttttgctac cgtgttgaat tatctcggca aagatcccaa cagcactaaa 6373
 gcggatgatt acaccggacc ggcaacagat ctgctgttaa agctgcgccc gaacattcgt 6433
 tatttccatt catctcaata cattaacgac ctggcaaacg gcgatatttg cgtcgtatc 6493
 ggctgggcag gtgatgtctg gcaggcgtca aaccgcgcga aggaagcgaa gaatggcgtg 6553
 aatgtctcgt tctcgattcc aaaagaaggg gcgatggcgt tctttgatgt attcgccatg 6613
 cctgcggatg ccaaaaaaaa agacgaagcc tatcagttcc tgaattacct gctgcgcccg 6673
 gatgtagtag cgcataattc cgaccatgtg ttctatgcc aaccaataa agcagccacg 6733
 ccgctgggtga gtgcggaagt ccgtgagaac ccaggatatt atccgcctgc ggatgttcgt 6793
 gcgaagctgt tcaactctgaa agtgcaggat ccgaaaatcg accgtgtgcg caccgcgcg 6853
 tggaccaaag tgaagagcgg aaaataatcc gcagtcgtag atgccggagg ggcgcaccac 6913
 accgcgcggc aattcgcacc attatggtgc gcttgcacac attcaatgcc ggagagcagc 6973
 cgtgaatgac gctatccctc gccgcaggc gaaaaccctg aaggcgtga cgcgcctatt 7033
 agaaatccgc aacctgacca aatcctacga tggtaacat gcggtggatg atgtcagcct 7093
 gaccatctac aaaggtgaaa tcttcgcgt gctgggcgca tccggctgtg gcaagtccac 7153
 gctgctgcgt atgctggcag gtttcgaaca accttctgcc ggacagataa tgcttgatgg 7213
 cgtcgatttg tcacaggttc cgccttacct gcgccccatc aatatgatgt ttcagtctta 7273
 cgcgctgttt ccgcatatga ccgtggaaca gaacatcgct tttggcctga aacaggacaa 7333
 actaccgaaa gcggaaattg ccagccgggt caatgagatg ctgggcctgg tgcatatgca 7393
 ggagttcgcc aaacgcaaac cgcacagct ttccggtggt cagcgacaac gtgtggccct 7453
 ggcccgaagc cttgcgaagc gcccgaaact attactgctc gatgagccga tgggcgcgct 7513
 ggataaaaag ctgcgtgaca ggatgcagct tgaagtgggt gatattctgg agcgcgtcgg 7573
 tgtgacttgt gtgatggtca cccacgatca ggaagaggcg atgaccatgg cggggcgcat 7633
 cgccattatg aatcgtggga aatttgcca gattggcgaa ccggaagaga tctacgagca 7693
 tccgactacc cgctatagcg ccgaatttat tggctcggta aacgtctttg aaggcgtact 7753
 caaagagcgt caggaagatg gcctggtgct tgattcgccg gggctggtgc atccactgaa 7813
 agtcgacgcg gatgcctcgg tggtcgataa cgtgccggta catgtggcgc tgcgcccga 7873


```

<210> 90
<211> 300
<212> PRT
<213> Escherichia coli

<400> 90
Val Lys Ile Ala Ile Leu Ser Arg Asp Gly Thr Leu Tyr Ser Cys Lys
  1             5             10             15
Arg Leu Arg Glu Ala Ala Ile Gln Arg Gly His Leu Val Glu Ile Leu
  20             25             30
Asp Pro Leu Ser Cys Tyr Met Asn Ile Asn Pro Ala Ala Ser Ser Ile
  35             40             45
His Tyr Lys Gly Arg Lys Leu Pro His Phe Asp Ala Val Ile Pro Arg
  50             55             60
Ile Gly Thr Ala Ile Thr Phe Tyr Gly Thr Ala Ala Leu Arg Gln Phe
  65             70             75             80
Glu Met Leu Gly Ser Tyr Pro Leu Asn Glu Ser Val Ala Ile Ala Arg
  85             90             95
Ala Arg Asp Lys Leu Arg Ser Met Gln Leu Leu Ala Arg Gln Gly Ile
  100            105            110
Asp Leu Pro Val Thr Gly Ile Ala His Ser Pro Asp Asp Thr Ser Asp
  115            120            125
Leu Ile Asp Met Val Gly Gly Ala Pro Leu Val Val Lys Leu Val Glu
  130            135            140
Gly Thr Gln Gly Ile Gly Val Val Leu Ala Glu Thr Arg Gln Ala Ala
  145            150            155            160
Glu Ser Val Ile Asp Ala Phe Arg Gly Leu Asn Ala His Ile Leu Val
  165            170            175
Gln Glu Tyr Ile Lys Glu Ala Gln Gly Cys Asp Ile Arg Cys Leu Val

```

180	185	190
Val Gly Asp Glu Val Val Ala Ala Ile Glu Arg Arg Ala Lys Glu Gly		
195	200	205
Asp Phe Arg Ser Asn Leu His Arg Gly Gly Ala Ala Ser Val Ala Ser		
210	215	220
Ile Thr Pro Gln Glu Arg Glu Ile Ala Ile Lys Ala Ala Arg Thr Met		
225	230	235
Ala Leu Asp Val Ala Gly Val Asp Ile Leu Arg Ala Asn Arg Gly Pro		
245	250	255
Leu Val Met Glu Val Asn Ala Ser Pro Gly Leu Glu Gly Ile Glu Lys		
260	265	270
Thr Thr Gly Ile Asp Ile Ala Gly Lys Met Ile Arg Trp Ile Glu Arg		
275	280	285
His Ala Thr Thr Glu Tyr Cys Leu Lys Thr Gly Gly		
290	295	300

<210> 91

<211> 10404

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (3788)..(4351)

<400> 91

```

accagctcca gcgtgtctta accgccgggc tggttaactga aaagtgggaa taagataagt 60
tttcttgact gggaaggtaa aataccgtat gcgttcagtc ggcaaaattt cgccaaatct 120
cctggatata ttccatcaga tagccacgat agagcagaaa acgctggatc ttaacttttt 180
ctgaaaagac agttggcaaa ggttcgccat attttcgcgt cgctgatcg cgcgccagt 240
cgcaccagtc gatgtcacat tcacgcacg ctttttctgt cgcttcgcgg gaaatacctt 300
tctgattcag ttcttgccga atacgcgcag gtccataacc tttgcggcta cggctggcga 360
taaagcgcgc aacaaatcgg ctgtcatoga gatagccatg ttcattggcac caggcaataa 420
cgcgctcgta atcttctgcc gtagcatcaa tctcttctgg gccatttttg ccataatcg 480
gtgccgcgag tttacgtcgc agttcttgct cactgtgata gcgcaccgcc agaatgcgta 540
ccgcacgata caacaggcga gcatatgccg ggcgacggga tgttgattct gtcattggcat 600
atccttaciaa cttaaaaaag caaaagggcc gcagatgcga cccttggtga tcaaacaaga 660
cgattaaaaa tcttcggttag tttctgctac gccttcgcta tcattctacag agaaatccg 720

```


aagctgatta gccagagggga agctcacgcc cccctcttgt aaatagctac tgtactcgcg 2460
ccagcgccac ggcttgtcct aactgccaga ccgccattgc gtaatgggtg ctgtggttgt 2520
aacgggtgat ggtgtagaag ttcggcagac cgtaccagta ctggtagccg gtgccaacat 2580
ccagacgcag caggctggct tgttgatggt tgcccagcgg ctgctgtggc gttaaacctg 2640
cggcggcaag ctgogaaatg ctgtacttag ttttgaagcc atttggcaag cctggagcct 2700
gaccgtttgc cattaccgag acctgatcgc ctttcaccca gccgtgcgct ttgaaatagt 2760
tcgccacgct accgatcgca tcaaccggat cccacagggt gatatgcccg tcgccgctga 2820
aatctaccgc atattgtttg taagacgacg gcataaactg tccgtagccc atcgccccgg 2880
caaaggaacc tttcagattg agcggatcgt cctgctcgtc gcgcgccatc aacaggaagg 2940
tttccagctc gccagagaaa tactccgcgc ggctgggta gttaaataac agcgttgcca 3000
gcgcacgcag gatgcgagtt ttcccatca cgcgccccca gcgggtttca acgccgataa 3060
tcccgacgat aatttccggc ggtactccat acacctgcca cgcgcgattc aacgcattct 3120
catactgatt ccagaaaacc acaccgttct gcacgttgtc cggcgtaata aattttttgc 3180
gataacggag ccatgcgcgc ttcggacctg atggcggttt caccgatgtg gttggtgcct 3240
ggttatccat cagccgcagt accgaatcca gacgcttcgc ctgggagaga atttctgca 3300
actgctgacg atcgaaaccg tgtttgttca ccattttgtc gatgaactgc tgggcattcg 3360
ggttattagc gaaatcgccg cccatctgca tcacattgtg ctgcggctca agcaggaagc 3420
cgccagacgg cgttccgggtg gtctatcag tctcagtagg ttttggcttg ctgctacagg 3480
cggcaagcaa cacaaaaagg ggaagcaatg ttacataacg acgcttgaac atgaggggtc 3540
catttaacag attcaaccag gggcaagtat ggtaaagcat cacgccccgc acaaggaagc 3600
ggtagtcact gcccgatacg gactttacat aactcaactc attcccctcg ctatcctttt 3660
attcaaaactt tcaaattaaa atatttatct ttcattttgc gatcaaaata acacttttaa 3720
atctttcaat ctgattagat taggttgccg tttggtaata aaacaataaa tcctgaagga 3780
gagaaca atg ata gaa acc att act cat ggt gca gag tgg ttt atc ggg 3829
Met Ile Glu Thr Ile Thr His Gly Ala Glu Trp Phe Ile Gly
1 5 10
ctg ttc caa aag ggc gga aag gtg ttt acc ggg atg gtg acc ggc att 3877
Leu Phe Gln Lys Gly Gly Lys Val Phe Thr Gly Met Val Thr Gly Ile
15 20 25 30
ctt ccg ctg ttg att agc ctg ctg gtt atc atg aac gca ctg att aat 3925
Leu Pro Leu Leu Ile Ser Leu Leu Val Ile Met Asn Ala Leu Ile Asn
35 40 45

ttt atc ggt cag cat cgt att gaa cgt ttt gct caa cgt tgc gcc ggt 3973
 Phe Ile Gly Gln His Arg Ile Glu Arg Phe Ala Gln Arg Cys Ala Gly
 50 55 60

aac cct gtt tcc cgt tac cta ctg tta ccg tgc att ggc acg ttt gtc 4021
 Asn Pro Val Ser Arg Tyr Leu Leu Leu Pro Cys Ile Gly Thr Phe Val
 65 70 75

ttt tgc aat ccg atg acc cta agc ctg ggt cgc ttt atg ccg gaa aag 4069
 Phe Cys Asn Pro Met Thr Leu Ser Leu Gly Arg Phe Met Pro Glu Lys
 80 85 90

tac aaa ccc agc tac tac gcg gcg gcc tct tat agc tgc cac tca atg 4117
 Tyr Lys Pro Ser Tyr Tyr Ala Ala Ala Ser Tyr Ser Cys His Ser Met
 95 100 105 110

aat ggc ctc ttc ccc cat atc aac cct ggc gaa ctg ttt gtt tat ctt 4165
 Asn Gly Leu Phe Pro His Ile Asn Pro Gly Glu Leu Phe Val Tyr Leu
 115 120 125

ggc att gcc agc ggt ctg aca acg ctg aac ctg cca ctt ggc cca ctg 4213
 Gly Ile Ala Ser Gly Leu Thr Thr Leu Asn Leu Pro Leu Gly Pro Leu
 130 135 140

gcg gtg agt tat ctg ctg gtt ggt ctg gtc acc aat ttc ttc cgc ggc 4261
 Ala Val Ser Tyr Leu Leu Val Gly Leu Val Thr Asn Phe Phe Arg Gly
 145 150 155

tgg gtg acc gat ctg acc acc gcc att ttt gag aaa aag atg ggc att 4309
 Trp Val Thr Asp Leu Thr Thr Ala Ile Phe Glu Lys Lys Met Gly Ile
 160 165 170

caa ctt gaa caa aaa gtt cac ctg gca gga gca aca tca tga 4351
 Gln Leu Glu Gln Lys Val His Leu Ala Gly Ala Thr Ser
 175 180 185

cgcatattcg gatcgaaaaa ggaacgggtg gctggggcgg cccgcttgag ctgaaagcca 4411
 cgccgggaaa aaaaatcgtc tatatcaccg ccggtaccg gcttgcgatt gttgacaaac 4471
 tggcacagct tactggctgg caggctattg acggatttaa agaaggtgaa cccgcggagg 4531
 cggaattgg tgctgcggta atcgactgtg gcggcacatt acgctgcggc atctatccga 4591
 aacgacgtat tcccaccatt aatatccact cgacgggcaa gtccgggtccg ctggcgcagt 4651
 acattgtgga agatatttat gtctctggcg taaaagaaga aaacatcact gtagtaggtg 4711
 atgcgacacc acaacccttt tccgtgggcc gtgactatga caccagtaag aaaatcaccg 4771
 aacaaagcga tggtttactg gcgaaggtgg gaatgggcat ggggtccacc gttgcggtgc 4831
 tgtttcaatc tggctgtgac accatcgaca ctgtattaaa aaccattctg ccgtttatgg 4891
 cattcgtctc ggcgctcatt ggcatcatta tggcttctgg ccttggtgac tggattgcc 4951

acggtcttgc tccgctggcg agccatccac tgggtctggt catgctggcg ctcactctgtt 5011
 ccttcccaact gctttcacct ttcttcggcc caggcgagct tatcgacacag gttatcggcg 5071
 tattgattgg cgtgcagatt ggtctcggca atattccgcc gcatctggct ttaccggcac 5131
 tgtttgccat caacgcgcag gcggcctgcg acttcatccc ggtcggtttg tcgctggcgg 5191
 aagcccgta ggacacggtt cgcgtcggcg tcccttctgt actggtgagc cgctttttaa 5251
 cggcgcgcc gactgtactg atcgctggt ttgtctcgg ttttatctat caatagaggc 5311
 tgaaacatga ccgttattta tcagaccacc atcaccgta tcggcgcgag tgccattgac 5371
 gccctcagt accagatgct catcacctt cgtgaaggcg cgctgcgga cctcgaagag 5431
 tattgcttca ttcatgcca cggcgagttg aaaggcgcac tccatcccg tttgcaattt 5491
 tcaactcggc agcatcgcta tccggtgacc gctgttgga gcgtggcga agacaacctt 5551
 cgcgaactgg gtcatgtcac cctgcgcttc gatggttta acgaagcga atttcgggc 5611
 actgtccatg tggcaggccc tgtcccgac gatatcgcg cggtatcgt tttgaagttt 5671
 gaatctgtta aggagtaaaa aatgaatcag gttgccgttg tcatcggtg tgggcaaacc 5731
 ttaggcgct tctgtgcca cggctctggt gccgaggggt atcgctcgc ggttgctgat 5791
 attcagagcg acaaagccgc aaatgtggca caagaaatta acgccgaata tggtgaaagt 5851
 atggcgtagc gttttggtgc tgacgccact agcgagcaaa gcgttctggc gctctctctg 5911
 ggggtagatg aaatctttgg tcgctggat ttgctggtct acagcgccgg aatagcaaaa 5971
 gcagccttta tcagcgactt ccagctcggc gattttgacc gttcgtaca ggtgaatctg 6031
 gtgggttatt tctgtgtgc gcgtgaattt tcgctttga tgatccgga cgggattcag 6091
 gggcgcatTA ttcatgcaa ctcgaaatcc ggcaaagtgg gcagcaaa caactctggc 6151
 tacagcgag cgaaatttgg tggcgtcgg ctgactcaat cactggcgct ggatctggcg 6211
 gagtacggca ttacggtgca ttactgatg ctcggttaacc tgctgaaatc gccgatgttc 6271
 cagtcaactg tgccacaata cgcgaccaag ctgggtatca aaccggatca agtcgagcag 6331
 tattacatcg acaaagtacc gctcaaagc ggctgcgatt atcaagatgt gctgaatatg 6391
 ctgctgttct acgccagtc taaggcgtcg tactgcaccg gacagtcgat caatgtcacc 6451
 ggcggtcagg tgatgttctg atcaacagcg gagatccatt aaggatctcc gtgagactat 6511
 agaatgcctg atgcgctacg ctcactcaggc atacaggact tccgccacta cattaaggaa 6571
 aagttatggt atccgcactc atcaccgtcg ccgttatcgc ctggtgtgcg caactggcct 6631
 taggcggtg gcaaatctct cgttttaacc gtgccttcga cacactatgc cagcaaggcg 6691

123456789101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960616263646566676869707172737475767778798081828384858687888990919293949596979899100

cgtagcaacg cagacgcac cgcactccagc acctgacgta gcgtgggtgat caggcgctga 10171
 aaacgatcct ggtgaccaat cccacgctgc aattcgatgg cgatattcgc cagcacatca 10231
 acggaaaaac tcattctttgc ctactgtca atttgactat agatattgtc atactgacca 10291
 tttgattgat agtcattttg actactcatt aatgggcata attttattta tagagtaaaa 10351
 acaatcagat aaaaaactgg cagcgaatct gcaattagca agacatcttt tta 10404

<210> 92

<211> 187

<212> PRT

<213> Escherichia coli

<400> 92

Met Ile Glu Thr Ile Thr His Gly Ala Glu Trp Phe Ile Gly Leu Phe
 1 5 10 15

Gln Lys Gly Gly Lys Val Phe Thr Gly Met Val Thr Gly Ile Leu Pro
 20 25 30

Leu Leu Ile Ser Leu Leu Val Ile Met Asn Ala Leu Ile Asn Phe Ile
 35 40 45

Gly Gln His Arg Ile Glu Arg Phe Ala Gln Arg Cys Ala Gly Asn Pro
 50 55 60

Val Ser Arg Tyr Leu Leu Leu Pro Cys Ile Gly Thr Phe Val Phe Cys
 65 70 75 80

Asn Pro Met Thr Leu Ser Leu Gly Arg Phe Met Pro Glu Lys Tyr Lys
 85 90 95

Pro Ser Tyr Tyr Ala Ala Ala Ser Tyr Ser Cys His Ser Met Asn Gly
 100 105 110

Leu Phe Pro His Ile Asn Pro Gly Glu Leu Phe Val Tyr Leu Gly Ile
 115 120 125

Ala Ser Gly Leu Thr Thr Leu Asn Leu Pro Leu Gly Pro Leu Ala Val
 130 135 140

Ser Tyr Leu Leu Val Gly Leu Val Thr Asn Phe Phe Arg Gly Trp Val
 145 150 155 160

Thr Asp Leu Thr Thr Ala Ile Phe Glu Lys Lys Met Gly Ile Gln Leu
 165 170 175

Glu Gln Lys Val His Leu Ala Gly Ala Thr Ser
 180 185

<210> 93

<211> 10390

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
340
341
342
343
344
345
346
347
348
349
350
351
352
353
354
355
356
357
358
359
360
361
362
363
364
365
366
367
368
369
370
371
372
373
374
375
376
377
378
379
380
381
382
383
384
385
386
387
388
389
390
391
392
393
394
395
396
397
398
399
400

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (152)..(226)

<400> 93

aaaattctta cgtaatttat aatcttttaa aaaagcattt aatattgctc cccgaacgat 60

tgtgattcga ttcacattta aacaatttca gaatagacaa aaactctgag tgtaataatg 120

tagcctcgtg tcttgcgagg ataagtgc t atg aat atc tta cat ata tgt 172
Met Asn Ile Leu His Ile Cys
1 5gtg acc tca aaa tgg ttc aat att gac aac aaa att gtc gat cac cgc 220
Val Thr Ser Lys Trp Phe Asn Ile Asp Asn Lys Ile Val Asp His Arg
10 15 20cct tga tttgcccttc tgtagccatc accagagcca aaccgattag attcaatgtg 276
Pro
25

atctatttgt ttgctatata ttaattttgc cttttgcaaa ggatcatctc cgtttattta 336

cttgtttttag taaatgatgg tgcttgcata tatatctggc gaattaatcg gtatagcaga 396

tgtaatatc acagggatca ctgtaattaa aataaatgaa ggattatgta atggaaaact 456

ttaaacatct cctgaaccg ttccgcattc gtgttattga gccagtaaaa cgtaccactc 516

gcgcttatcg tgaagaggca attattaaat ccggtatgaa cccgttcctg ctggatagcg 576

aagatgtttt tatcgattta ctgaccgaca gcggcaccgg ggcggtgacg cagagcatgc 636

aggctgcgat gatgcgcggc gacgaagcct acagcggcag tcgtagctac tatgcgttag 696

ccgagtcagt gaaaaatata tttggttatc aatacaccat tccgactcac cagggccgtg 756

gcgcagagca aatctatatt ccggtactga ttaaaaaacg cgagcaggaa aaaggcctgg 816

atcgcagcaa aatgggtggcg ttctctaact atttctttga taccacgcag ggccatagcc 876

agatcaacgg ctgtaccgtg cgtaacgtct atatcaaaga agccttcgat acgggcgtgc 936

gttacgactt taaaggcaac tttgaccttg agggattaga acgcggtatt gaagaagttg 996

gtccgaataa cgtgccgtat atcgttgcaa ccatcaccag taactctgca ggtggtcagc 1056

cggtttcact ggcaaaactta aaagcgatgt acagcatcgc gaagaaatac gatattccgg 1116

tggtaatgga ctccgcgcgc tttgctgaaa acgcctatct catcaagcag cgtgaagcag 1176

aatacaaaga ctggaccatc gagcagatca cccgcgaaac ctacaaatat gccgatatgc 1236

tggcgatgtc cgccaagaaa gatgcgatgg tgccgatggg cggcctgctg tgcataaag 1296

1000
 900
 800
 700
 600
 500
 400
 300
 200
 100
 0

acgacagctt ctttgatgtg tacaccgagt gcagaaccct ttgctgtgtg caggaaggct 1356
 tcccgacata tggcggcctg gaaggcgcg cgatggagcg tctggcggtg ggtctgtatg 1416
 acggcatgaa tctcgactgg ctggcttate gtatcgcgca ggtacagtat ctggctgatg 1476
 gtctggaaga gattggcggt gtctgccagc aggcggggcg tcacgcggca ttcggtgatg 1536
 ccggtaaaact gttgccgcat atcccggcag accagttccc ggcacaggcg ctggcctgcg 1596
 agctgtataa agtcgccggt atccgtgcgg tagaaattgg ctctttcctg ttaggccgcg 1656
 atccgaaaac cggtaaaca ctgccatgcc cggctgaact gctgcgttta accattccgc 1716
 gcgcaacata tactcaaaca catatggact tcattattga agcctttaa catgtgaaag 1776
 agaacgcggc gaatattaaa ggattaacct ttacgtacga accgaaagta ttgcgtcact 1836
 tcaccgcaaa acttaaagaa gtttaattaa tactacagag tggctataag gatgttagcc 1896
 actctcttac cctacatcct caataacaaa aatagccttc ctctaaagg ggcacatga 1956
 ctgatcaagc tgaaaaaaag cactctgcat tttgggggtg tatgggtata gcaggtagc 2016
 taattgggtg aggtatgttt gctttacctg ttgatcttgc cgggtgcctgg ttttctggtg 2076
 gtgcctttat ccttatcatt gcctggtttt caatgcttca ttccgggtta ttgttattag 2136
 aagcaaattt aaattatccc gtcggctcca gttttaacac catcaccaaa gatttaatcg 2196
 gtaacacctg gaacattatc agcggtatta ccgttgccct cgttctctat atcctcactt 2256
 atgcctatat ctctgcta at ggtgcgatca ttagtgaaac gatatcaatg aatttgggtt 2316
 atcacgctaa tccacgtatt gtcgggatct gcacagccat tttcgttgcc agcgtattgt 2376
 ggttaagtgc gttagccgcc agtcgtatta cctcattgtt cctcgggctg aagattatct 2436
 cctttgtgat cgtgtttggt tcttttttct tccaggtcga ttactccatt ctgcgcgacg 2496
 ccaccagctc cactgcggga acgtcttact tcccgatat ctttatggct ttgccggtgt 2556
 gtctggcgctc atttgggttc cacggcaata tcccagcct gattatttgc tatggaaaac 2616
 gcaaagataa gttaatcaaa agcgtggtat ttggttcgct gctggcgctg gtgatttate 2676
 tcttctggct ctattgcacc atggggaata ttccgcgaga aagctttaag gcgattatct 2736
 cctcaggcgg caacgttgat tcgctggtga aatcgcttct cggcaccaaa cagcacggca 2796
 ttatcgagtt ttgcctgctg gtgttctcta acttagctgt tgccagttcg ttctttggtg 2856
 tcaogctggg gttgttcgat tatctggcg acctgtttaa gattgataac tcccacggcg 2916
 ggogtttcaa aaccgtgctg ttaaccttcc tgccacctgc gttgtgtat ctgatcttcc 2976

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400

agacggcgct ggtatccatg ccagcaacgc caagaatttg cgggttaaca aaaacgatgt 8196
 aaaccatcgt caggaagggtg gtaaaaccgg cgatcacttc ggtccgtgcc gtcgtgccat 8256
 gttcgcgcag tttaaacacg cgttccagca tcccctgacc agaagtctgg gtggtatgtt 8316
 gatgactcat tatctatttc cgaacaagga gggaaaatcc gtcgctatcg tataccaaaa 8376
 tgcgacaata ggcgcgtttg tgagagactt ttttattgga tttacttata cggcaacgat 8436
 tgcgttgccg aaatcggctc tacgaaaacg ttaaactgat taaaaggaa aggcattgtcc 8496
 cggatagaag cggtatTTTT cgaactgcgc ggtacgctgg tcgacagtga agtcatttgc 8556
 tctcgcgcgt atgtaacgat gtttcaggaa tttggtatta cgctcgatcc tgaagaggta 8616
 ttcaaacggt tcaaagggtg aaaactgtac gaaattatcg atattgtttc cttgaacat 8676
 ggtgttacgt tagcgaaaac agaagctgaa cacgtttacc gtgcagaagt cgctcggctg 8736
 ttcgattcag aactggaagc catcgaaggg gctggagcgc tcctgtcagc gatcactgcg 8796
 ccaatgtgtg tggatatctaa cggcccaaatt aacaaaatgc agcattctat gggcaagctg 8856
 aatatgttgc actacttccc ggataaactg ttcagcggct acgatattca gcgctggaag 8916
 ccagaccogg cgttaatgtt ccatgcggca aaagcgatga atgtaaatgt agaaaactgc 8976
 attctggttg atgactcagt tgccggtgca caatctggta tcgacgcagg tatggaagtg 9036
 ttctacttct gcgccgacct gcacaataag ccgatcgctc acccgaaagt caccaccttt 9096
 acccatcttt cgcagttacc tgaactgtgg aaagcgcggt gttgggatat tacggcatag 9156
 ttcttcacac tccottcact taccocgctt aaattggcgc tcaaaggtaa gtaaagggag 9216
 tttgatatgt ctgtttcacg tcgggtaata catcacggac tttattttgc agtttttagga 9276
 ccgttaattg gtgttctgtt tcttgtctc tacatattct tcgcaaaaga accgctggtt 9336
 ctttgggtga taatacatcc aatttttctc ttattgtcga taactacggg agctattcct 9396
 gcgttggtta ccggtgtaat ggttgccgtg ctgccggaaa agatcgggtc acagaaacgt 9456
 tatcgttgtc tggctggtgg catagggtgg gtcgttatca ccgagatcta ttgtgcagtt 9516
 attgtacata ttaaggcat ggcttctctg gagttgtttg aaaacattct ttctggtgac 9576
 agtctcgttg tcgcacatc tctgcattg ctggcagggt tggatgatgag cagaatcatt 9636
 accgctctac ccggttgga tatttcatgt cctgaaacag actctttaag ttaagcggga 9696
 tactttatct ttgggtact caaaagcaga caggatgttt ctatgactca aaatatcagg 9756
 ccgttacctt aattcaaata tcatcccaag cactggaaa caggcgcatt tgaacaggat 9816

aaaaccgtag agtgcgattg ctgtgaacaa cagacgtcag tttattactc gggcccttt 9876
 tattgcgttg atgaagttga acatctctgt ccgtgggtga ttgcggacgg ttctgctgct 9936
 gaaaagtttg caggtagttt tcaggatgat gccagcatag aagggtgtga atttgagtat 9996
 gatgaagagg acgaatttgc cgggtattaag aacacatata ctgatgaaat gctgaaagag 10056
 ttggttgaac gcaagccagg ttatcatgga tggcagcagg aattctggct cgcgcatgtg 10116
 ggcgatttct gtgtttttat cggctatgtg ggctggaatg atataaaaga tcgcctcgat 10176
 gaatttgcca accttgaaga agattgtgag aatttcggta ttagaaattc tgatctagct 10236
 aaatgcctgc aaaaggggtgg tcattgtcag ggttatctct tccgctgtct ccaactgcggc 10296
 aagctgagac tgtgggggtga tttttcgtag ttattttaa atgagaaca ggccggagcg 10356
 taattcacac atccggcctt atttcttaag ctta 10390

<210> 94

<211> 24

<212> PRT

<213> Escherichia coli

<400> 94

Met Asn Ile Leu His Ile Cys Val Thr Ser Lys Trp Phe Asn Ile Asp

1

5

10

15

Asn Lys Ile Val Asp His Arg Pro

20

<210> 95

<211> 10480

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (6265)..(7455)

<400> 95

ttgatcaact cctgatgatt aatgagcagt tttatgagaa aagtgtggcg cggatcatgg 60

tttaatcgag gaaaaacgcc ttttcctgga tcataaagtg gtagaacaca ttgcattcaa 120

atcgcgcgta atgaataaag atgtcagaca acttcctcac cgtaacgcat agtgctggta 180

cggttgcgcc catctttctt cgagcgatac agacacgtat cggcttcgac catcaattta 240

ttaaagtcac cggtcagcgt taggtacgat gcgcgaccac taccgacgcc aatacttacc 300

gtgagataaa gcgttttttg ttgccagggtg aatggttgca gttcaacgcc tttacggatt 360

ttttccgcca ttagcagacc atcgacagga ttcaccgacg gcaactgcaac agcaaattct 420

accacatatt	gaacccctgc	cttcggatca	ccataccgct	gcagattact	tacgccagtt	5580
tgatttgctt	gtcctgaatt	ttatctctcg	cggtaat	ttt	gtcatactcc	cccgattatg 5640
gaataactct	gaggttcaca	gatgggtcgt	caataaagat	cctaacttga	tcaccgccat	5700
tctcgacata	acggacagcg	aattaaaaga	ggatttggtg	caaagcctga	tggattcatt	5760
aggttctaac	aaacatgtac	taccogaagt	ctgcatctgc	tttttatccc	ttttagcaga	5820
acaagaatct	cctcattttc	agaacttggt	tttatttttc	gccaatatgt	tattgcaacta	5880
tcaccaat	ttt	atgaatccca	atgaaagtga	tttgaatgac	gtggtgatgc	cagcatcatt 5940
aagtgatgat	aaaattatca	aacatatggc	gcgaggacc	ctcaaactgt	ttgtaaaaaa	6000
tgaaacaccg	ccaaaagtta	ctcacgaaga	cctggtgaaa	aacaggcctc	gctcccctgt	6060
cagaccacct	ataccgcga	ccgccaaaac	gccagacctc	cctgaacgtc	attaaaccgt	6120
gatgttaccg	actctctgac	gcgtgaaaga	atcagcgtca	gagaaacgga	aaacgcgac	6180
cagatcacaa	atgcattgta	ttcacatcat	taaccgtttt	aagatcattt	catcactttt	6240
tcgcaactca	cccgataatc	tggt	atg	aca	aca	aac act gtt tcc cgc aaa 6291
			Met	Thr	Thr	Asn Thr Val Ser Arg Lys
			1			5
gtg gcg tgg cta cgg gtc gtt acg ctg gca gtc gcc gcc ttc atc ttc	6339					
Val Ala Trp Leu Arg Val Val Thr Leu Ala Val Ala Ala Phe Ile Phe						
10 15 20 25						
aac acc acc gaa ttt gtc cct gtt ggc ctg ctc tct gac att gcg caa	6387					
Asn Thr Thr Glu Phe Val Pro Val Gly Leu Leu Ser Asp Ile Ala Gln						
30 35 40						
agt ttt cac atg caa acc gct cag gtc ggc atc atg ttg acc att tac	6435					
Ser Phe His Met Gln Thr Ala Gln Val Gly Ile Met Leu Thr Ile Tyr						
45 50 55						
gca tgg gta gta gcg cta atg tca ttg cct ttt atg tta atg acc agt	6483					
Ala Trp Val Val Ala Leu Met Ser Leu Pro Phe Met Leu Met Thr Ser						
60 65 70						
cag gtt gaa cgg cgc aaa tta ctg atc tgc ctg ttt gtg gtg ttt att	6531					
Gln Val Glu Arg Arg Lys Leu Leu Ile Cys Leu Phe Val Val Phe Ile						
75 80 85						
gcc agc cac gta ctg tcg ttt ttg tcg tgg agc ttt acc gtt ctg gtg	6579					
Ala Ser His Val Leu Ser Phe Leu Ser Trp Ser Phe Thr Val Leu Val						
90 95 100 105						
atc agt cgc att ggt gtg gct ttt gca cat gcg att ttc tgg tcg att	6627					
Ile Ser Arg Ile Gly Val Ala Phe Ala His Ala Ile Phe Trp Ser Ile						
110 115 120						
acg gcg tct ctg gcg atc cgt atg gct ccg gcc ggg aag cga gca cag	6675					

Thr	Ala	Ser	Leu	Ala	Ile	Arg	Met	Ala	Pro	Ala	Gly	Lys	Arg	Ala	Gln		
			125					130					135				
gca	ttg	agt	tta	att	gcc	acc	ggt	aca	gca	ctg	gcg	atg	gtc	tta	ggt	6723	
Ala	Leu	Ser	Leu	Ile	Ala	Thr	Gly	Thr	Ala	Leu	Ala	Met	Val	Leu	Gly		
			140				145					150					
tta	cct	ctc	ggg	cgc	att	gtg	ggc	cag	tat	ttc	ggt	tgg	cga	atg	acc	6771	
Leu	Pro	Leu	Gly	Arg	Ile	Val	Gly	Gln	Tyr	Phe	Gly	Trp	Arg	Met	Thr		
			155				160				165						
ttc	ttc	gcg	att	ggt	att	ggg	gcg	ctt	atc	acc	ctt	ttg	tgc	ctg	att	6819	
Phe	Phe	Ala	Ile	Gly	Ile	Gly	Ala	Leu	Ile	Thr	Leu	Leu	Cys	Leu	Ile		
170						175				180					185		
aag	tta	ctt	ccc	tta	ctg	ccc	agt	gag	cat	tcc	ggt	tca	ctg	aaa	agc	6867	
Lys	Leu	Leu	Pro	Leu	Leu	Pro	Ser	Glu	His	Ser	Gly	Ser	Leu	Lys	Ser		
			190						195					200			
ctc	ccg	cta	ttg	ttc	cgc	cgc	ccg	gca	ttg	atg	agc	att	tat	ttg	tta	6915	
Leu	Pro	Leu	Leu	Phe	Arg	Arg	Pro	Ala	Leu	Met	Ser	Ile	Tyr	Leu	Leu		
			205					210					215				
act	gtg	gtg	gtt	gtc	acc	gcc	cat	tac	acg	gca	tac	agc	tat	atc	gag	6963	
Thr	Val	Val	Val	Val	Thr	Ala	His	Tyr	Thr	Ala	Tyr	Ser	Tyr	Ile	Glu		
			220				225					230					
cct	ttt	gta	caa	aac	att	gcg	gga	ttc	agc	gcc	aac	ttt	gcc	acg	gca	7011	
Pro	Phe	Val	Gln	Asn	Ile	Ala	Gly	Phe	Ser	Ala	Asn	Phe	Ala	Thr	Ala		
			235				240				245						
tta	ctg	tta	tta	ctc	ggt	ggt	gcg	ggc	att	att	ggc	agc	gtg	att	ttc	7059	
Leu	Leu	Leu	Leu	Leu	Gly	Gly	Ala	Gly	Ile	Ile	Gly	Ser	Val	Ile	Phe		
250					255				260						265		
ggt	aaa	ctg	ggt	aat	cag	tat	gcg	tct	gcg	ttg	gtg	agt	acg	gcg	att	7107	
Gly	Lys	Leu	Gly	Asn	Gln	Tyr	Ala	Ser	Ala	Leu	Val	Ser	Thr	Ala	Ile		
				270				275						280			
gcg	ctg	ttg	ctg	gtg	tgc	ctg	gca	ttg	ctg	tta	cct	gcg	gcg	aac	agt	7155	
Ala	Leu	Leu	Leu	Val	Cys	Leu	Ala	Leu	Leu	Leu	Pro	Ala	Ala	Asn	Ser		
			285					290					295				
gaa	ata	cac	ctc	ggg	gtg	ctg	agt	att	ttc	tgg	ggg	atc	gcg	atg	atg	7203	
Glu	Ile	His	Leu	Gly	Val	Leu	Ser	Ile	Phe	Trp	Gly	Ile	Ala	Met	Met		
			300				305					310					
atc	atc	ggg	ctt	ggt	atg	cag	gtt	aaa	gtg	ctg	gcg	ctg	gca	cca	gat	7251	
Ile	Ile	Gly	Leu	Gly	Met	Gln	Val	Lys	Val	Leu	Ala	Leu	Ala	Pro	Asp		
			315			320					325						
gct	acc	gac	gtc	gcg	atg	gcg	cta	ttc	tcc	ggc	ata	ttt	aat	att	gga	7299	
Ala	Thr	Asp	Val	Ala	Met	Ala	Leu	Phe	Ser	Gly	Ile	Phe	Asn	Ile	Gly		
330					335					340					345		
atc	ggg	gcg	ggt	gcg	ttg	gta	ggt	aat	cag	gtg	agt	ttg	cac	tgg	tca	7347	
Ile	Gly	Ala	Gly	Ala	Leu	Val	Gly	Asn	Gln	Val	Ser	Leu	His	Trp	Ser		

350	355	360	
atg tcg atg att ggt tat gtg ggc gcg gtg cct gct ttt gcc gcg tta			7395
Met Ser Met Ile Gly Tyr Val Gly Ala Val Pro Ala Phe Ala Ala Leu			
365	370	375	
att tgg tca atc att ata ttt cgc cgc tgg cca gtg aca ctc gaa gaa			7443
Ile Trp Ser Ile Ile Ile Phe Arg Arg Trp Pro Val Thr Leu Glu Glu			
380	385	390	
cag acg caa tag ttgaaaggcc cattcgggcc ttttttaatg gtacgtttta			7495
Gln Thr Gln			
395			
atgatttcca ggatgccgtt aataataaac tgcacaccca tacataccag caggaatccc			7555
atcagacggg agatcgcttc aatgccaccc ttgcccacca gccgcataat tgcgccggag			7615
ctgcgtaggc ttccccacaa aataaccgcc accaggaaaa agatcagcgg cggcgcaacc			7675
atcagtaccc aatcagcgaa ggttgaactc tgacgcactg tggacgccga gctaataatc			7735
atcgctatgg ttcccggaacc ggcagtactt ggcattgcca gcggcacaaa ggcaatattg			7795
gcactggggt catottccag ctottccgac ttgcttttcg cctccggtga atcaatcgct			7855
ttctgttgcg gaaagagcat ccgaaaaccg ataaacgcga cgattaagcc gcctgcaatt			7915
cgcagaccgg gaatcgaaat gccaaatgta tccatcacca gttgcccggc gtaatacgcc			7975
accatcatga tggcaaatac gtacaccgag gccatcaacg actgacgatt acgttcggca			8035
ctgttcatgt tgcttgccag gccaaagaaat aacgcgacag ttgttaatgg gttagctaac			8095
ggcagcaaca ccaccagccc caggccaatt gctttaaaca aatctaacat tgggtggtgt			8155
tatcctgtgt atctgggtta tcagcgaaaa gtataagggg taaacaagga taaagtgtca			8215
ctctttagct agccttgcac cgcattgaac aaaacttgaa ccgatttagc aaaacgtggc			8275
atcgggtcaat tcattcattt gaattatact tgcttgggca atattatccc ctgcaactaa			8335
ttacttgcca gggcaactaa tgtgaaaagt accagcgatc tgttcaatga aattattcca			8395
ttgggtcgct taatccatat ggttaatcag aagaaagatc gcctgcttaa cgagtatctg			8455
tctccgctgg atattaccgc ggcacagttt aaggtgctct gctctatccg ctgcgcggcg			8515
tgtattactc cgggtgaact gaaaaaggta ttgtcggtcg acctgggagc actgaccgt			8575
atgctggatc gcctggtctg taaaggctgg gtggaaaggc tgccgaaccc gaatgacaag			8635
cgcggcgtag tggtaaaact taccaccggc ggcgcggcaa tatgtgaaca atgccatcaa			8695
ttagttggcc aggacctgca ccaagaatta aaaaaaac tgacggcgga cgaagtggca			8755
acacttgagt atttgcttaa gaaagtcctg ccgtaaacaa aaaagaggta tgacgatgtc			8815

atg tcg atg att ggt tat gtg ggc gcg gtg cct gct ttt gcc gcg tta
 Met Ser Met Ile Gly Tyr Val Gly Ala Val Pro Ala Phe Ala Ala Leu
 365 370 375
 att tgg tca atc att ata ttt cgc cgc tgg cca gtg aca ctc gaa gaa
 Ile Trp Ser Ile Ile Ile Phe Arg Arg Trp Pro Val Thr Leu Glu Glu
 380 385 390
 cag acg caa tag ttgaaaggcc cattcgggcc ttttttaatg gtacgtttta
 Gln Thr Gln
 395
 atgatttcca ggatgccgtt aataataaac tgcacaccca tacataccag caggaatccc
 atcagacggg agatcgcttc aatgccaccc ttgcccacca gccgcataat tgcgccggag
 ctgcgtaggc ttccccacaa aataaccgcc accaggaaaa agatcagcgg cggcgcaacc
 atcagtaccc aatcagcgaa ggttgaactc tgacgcactg tggacgccga gctaataatc
 atcgctatgg ttcccggaacc ggcagtactt ggcattgcca gcggcacaaa ggcaatattg
 gcactggggt catottccag ctottccgac ttgcttttcg cctccggtga atcaatcgct
 ttctgttgcg gaaagagcat ccgaaaaccg ataaacgcga cgattaagcc gcctgcaatt
 cgcagaccgg gaatcgaaat gccaaatgta tccatcacca gttgcccggc gtaatacgcc
 accatcatga tggcaaatac gtacaccgag gccatcaacg actgacgatt acgttcggca
 ctgttcatgt tgcttgccag gccaaagaaat aacgcgacag ttgttaatgg gttagctaac
 ggcagcaaca ccaccagccc caggccaatt gctttaaaca aatctaacat tgggtggtgt
 tatcctgtgt atctgggtta tcagcgaaaa gtataagggg taaacaagga taaagtgtca
 ctctttagct agccttgcac cgcattgaac aaaacttgaa ccgatttagc aaaacgtggc
 atcgggtcaat tcattcattt gaattatact tgcttgggca atattatccc ctgcaactaa
 ttacttgcca gggcaactaa tgtgaaaagt accagcgatc tgttcaatga aattattcca
 ttgggtcgct taatccatat ggttaatcag aagaaagatc gcctgcttaa cgagtatctg
 tctccgctgg atattaccgc ggcacagttt aaggtgctct gctctatccg ctgcgcggcg
 tgtattactc cgggtgaact gaaaaaggta ttgtcggtcg acctgggagc actgaccgt
 atgctggatc gcctggtctg taaaggctgg gtggaaaggc tgccgaaccc gaatgacaag
 cgcggcgtag tggtaaaact taccaccggc ggcgcggcaa tatgtgaaca atgccatcaa
 ttagttggcc aggacctgca ccaagaatta aaaaaaac tgacggcgga cgaagtggca
 acacttgagt atttgcttaa gaaagtcctg ccgtaaacaa aaaagaggta tgacgatgtc

cagacgcaat actgacgcta ttaccattca tagcattttg gactggatcg aggacaacct 8875
 ggaatcgcca ctgtcaactgg agaaagtgtc agagcggttcg ggttactcca aatggcacct 8935
 gcaacggatg tttaaaaaag aaaccgggtca ttcattaggc caatacatcc gcagccgtaa 8995
 gatgacggaa atcgcgcaaa agctgaagga aagtaacgag ccgatactct atctggcaga 9055
 acgatatggc ttogagtgc aacaaactct gacccgaacc ttcaaaaatt actttgatgt 9115
 tccgccgcat aaataccgga tgaccaatat gcagggcgaa tcgcgctttt tacatccatt 9175
 aaatcattac aacagctagt tgaaaacgtg acaacgtcac tgaggcaatc atgaaaccac 9235
 tttcatccgc aatagcagct gcgcttattc tcttttccgc gcagggcggt gcggaacaaa 9295
 ccacgcagcc agttgttact tcttgtgcca atgtcgtggt tgttccccca tcgcaggaac 9355
 acccaccggt tgatttaaata cacatgggta ctggcagtga taagtcggat gcgctcggcg 9415
 tgccctatta taatcaacac gctatgtagt ttgttctggc cccgacatct cggggcttat 9475
 taacttccca cctttaccgc tttacgccac cgcaagccaa atacattgat atacagcccg 9535
 gtcataatga gcaccgcacc taaaaattgc agaccgtta agcgttcac caacaatagt 9595
 gccgcacttg ccagtcttac tacgggcacc agtaacgata acggtgcaac ccgccaggtt 9655
 tcatagcgtc ccagtaacgt ccccagatc ccataaccaa caattgtgc cacaaacgcc 9715
 agatacatca gagacaagat ggtggtcata tcgatagtaa ccagactgtg aatcatgggt 9775
 gcggaaccat cgagaatcag cgaggcaaca aagaaggga tgattgggat taaagcgctc 9835
 cagattacca gcgacatcac cgccggacgc gttgagtgcg acatgatctt tttattgaag 9895
 atgttgccac acgcccact aaatgctgcc gccagggta acataaagcc gagcatcgcc 9955
 acatgctgac cgttcagact atcttcgatt aacaccagta cgccaaaaat cgctaaggcg 10015
 atccccgcca attgtttgcc atgcagtcgc tccccgaaag taaacgcgcc aagcatgata 10075
 gtaaaaaacg cctgtgctg taacaccagc gaagccagtc cagcaggcat accgaagtta 10135
 atggcacaaa aaagaaaagc aaactgcga aaactgatgg ttaatccata cccagcagc 10195
 aaattcagtg gtactttcgg tcgtgcgaca aaaaagatag ccggaaaagc gaccagcata 10255
 aagcgcaaac cggccagcat cagcgggtgc atgttatgaa gcccacttt gatgaccaca 10315
 aaatttagcc ccatacgac cactaccagt agcgccaaca cccatcttt tcgcgacatt 10375
 ctaccgctc tgaatttcac cttttgtaag caatcaactt agctgaattt acttttcttt 10435
 aacagttgat tcgttagtcg ccggttacga cggcattaat gcgca 10480

Ala Ser Ala Leu Val Ser Thr Ala Ile Ala Leu Leu Leu Val Cys Leu
 275 280 285

Ala Leu Leu Leu Pro Ala Ala Asn Ser Glu Ile His Leu Gly Val Leu
 290 295 300

Ser Ile Phe Trp Gly Ile Ala Met Met Ile Ile Gly Leu Gly Met Gln
 305 310 315 320

Val Lys Val Leu Ala Leu Ala Pro Asp Ala Thr Asp Val Ala Met Ala
 325 330 335

Leu Phe Ser Gly Ile Phe Asn Ile Gly Ile Gly Ala Gly Ala Leu Val
 340 345 350

Gly Asn Gln Val Ser Leu His Trp Ser Met Ser Met Ile Gly Tyr Val
 355 360 365

Gly Ala Val Pro Ala Phe Ala Ala Leu Ile Trp Ser Ile Ile Ile Phe
 370 375 380

Arg Arg Trp Pro Val Thr Leu Glu Glu Gln Thr Gln
 385 390 395

<210> 97

<211> 11756

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (3168)..(3890)

<400> 97

atgggctcca caaatgggg acatcaaaga aaagcagtgg cactaattaa gactgatgcc 60
 ctgcggaaaa gttctgcggt tgtgcaaaaa aatttcattt tcagggaac ttcagtttta 120
 tcctaatacct ggccatacca tgacgatgat tgtccctgcc agcgtcagca ggacgttggc 180
 gattgcatag gtgcccgcac agcccagcgc cgggatgtta ctgcgagctg tatcactgat 240
 gatctccatt gccggcgcg aggtacgtgc gccatcatt gcgccgaaca acagcgcgcg 300
 gttcattcgc aatacataag caccgaacaa gaaacagata accacgggca ccagactgac 360
 aatcaatccg gcaatcaaca tctgaccgcc aatcgcgccc aggccgttat taataccgct 420
 accggcgctc agaccaacgc ctgccataaa caccatcaag ccgaactctt tcaccatgct 480
 taatgcaccc tgcggaatgt aaccgaaggt cgggtgggta gcacgcataa agcccagcat 540
 aattccggcg aataacaacc cggcagcgtt ccccatgccg aaactgaatg tgctgaactg 600
 gaaggtgatc atcccgatca tcagcccaat aacaaagaag gcgcagaatg ccagcaggtc 660

11

ggcaagagct	ggcatggtta	ctaagcgcg	tggtctggtg	tgcgctgggg	gcactgtgtt	2400
tcttatattat	cagtagtttg	tttaaaccac	agcacagaaa	aatcagtaa	agccctcaac	2460
gcgagggcctt	gtcagacgat	caggcggtcca	gattttcttt	cacccatgca	gcaaaatcgg	2520
tatagccgcc	gatatgttgc	tgatcgacaa	aatctgcgg	cacggtttct	acgggtttac	2580
ctgccttttg	ttgtagatct	tctttagtga	tcccttcgc	acgaatatct	acatactgat	2640
actgaaaatc	atcgcgttca	ttgctcaatt	tctcagccag	atcttttgca	cgcacacagt	2700
aaggggcaacc	cgaacgacca	aaaataacgg	tttgcattat	ttctctctc	atagatttat	2760
gcctgtaatg	atcacgctaa	aatgtattcg	ctgaaagtag	gtttaacctg	ttgcattaat	2820
tgctaaaagc	tataactggt	aaacacaata	cagtgaaaag	ttttagactg	aaggctcact	2880
ttgcagaggg	aagcgatatgc	gcgcgatcgg	taaattgcct	aaaggcgtgt	tgatactgga	2940
atttatcgga	atgatgctac	tggcggtggc	gctgctgtcg	gtaagcgact	ccctgtcgct	3000
gcctgagcca	ttttctcggc	cagaagtgca	gattctgatg	atTTTTctcg	gtgttttgct	3060
catgcttccc	gotgcggtgg	tggttattct	tcaggtggca	aaacgtcttg	ccccacagct	3120
gatgaaccgt	ccaccgcaat	attcacgttc	agaaagagaa	aaagata	atg acg cca	3176
					Met Thr Pro	
					1	
acc att gaa ctt att tgt ggc cat cgc tcc att cgc cat ttc act gat						3224
Thr Ile Glu Leu Ile Cys Gly His Arg Ser Ile Arg His Phe Thr Asp						
5						10
gaa ccc att tcc gaa gcg cag cgt gag gcg att att aac agc gcc cgt						3272
Glu Pro Ile Ser Glu Ala Gln Arg Glu Ala Ile Ile Asn Ser Ala Arg						
20						30
gcg acg tcc agt tcc agt ttt ttg cag tgc agt agc att att cgc att						3320
Ala Thr Ser Ser Ser Ser Phe Leu Gln Cys Ser Ser Ile Ile Arg Ile						
						40
						45
						50
acc gac aaa gcg tta cgt gaa gaa ctg gtg acg ctg acc ggc ggg caa						3368
Thr Asp Lys Ala Leu Arg Glu Glu Leu Val Thr Leu Thr Gly Gly Gln						
						55
						60
						65
aaa cac gta gcg caa gcg gcg gag ttc tgg gtg ttc tgt gcc gac ttt						3416
Lys His Val Ala Gln Ala Ala Glu Phe Trp Val Phe Cys Ala Asp Phe						
						70
						75
						80
aac cgc cat tta cag atc tgt ccg gat gct cag ctc ggc ctg gcg gaa						3464
Asn Arg His Leu Gln Ile Cys Pro Asp Ala Gln Leu Gly Leu Ala Glu						
						85
						90
						95
caa ctg ttg ctc ggt gtc gtt gat acg gca atg atg gcg cag aat gca						3512
Gln Leu Leu Leu Gly Val Val Asp Thr Ala Met Met Ala Gln Asn Ala						
100						105
						110
						115

tta atc gca gcg gaa tcg ctg gga ttg ggc ggg gta tat atc ggc ggc 3560
 Leu Ile Ala Ala Glu Ser Leu Gly Leu Gly Gly Val Tyr Ile Gly Gly
 120 125 130

ctg cgc aat aat att gaa gcg gtg acg aaa ctg ctt aaa tta ccg cag 3608
 Leu Arg Asn Asn Ile Glu Ala Val Thr Lys Leu Leu Lys Leu Pro Gln
 135 140 145

cat gtt ctg ccg ctg ttt ggg ctg tgc ctt ggc tgg cct gcg gat aat 3656
 His Val Leu Pro Leu Phe Gly Leu Cys Leu Gly Trp Pro Ala Asp Asn
 150 155 160

ccg gat ctt aag ccg cgt tta ccg gcc tcc att ttg gtg cat gaa aac 3704
 Pro Asp Leu Lys Pro Arg Leu Pro Ala Ser Ile Leu Val His Glu Asn
 165 170 175

agc tat caa ccg ctg gat aaa ggc gca ctg gcg cag tat gac gag caa 3752
 Ser Tyr Gln Pro Leu Asp Lys Gly Ala Leu Ala Gln Tyr Asp Glu Gln
 180 185 190 195

ctg gcg gaa tat tac ctg acc cgt ggc agc aat aat cgc ccg gat acc 3800
 Leu Ala Glu Tyr Tyr Leu Thr Arg Gly Ser Asn Asn Arg Arg Asp Thr
 200 205 210

tgg agc gat cat atc cgc cga aca atc att aaa gaa agc cgc cca ttt 3848
 Trp Ser Asp His Ile Arg Arg Thr Ile Ile Lys Glu Ser Arg Pro Phe
 215 220 225

att ctg gat tat ttg cac aaa cag ggt tgg gcg acg cgc taa 3890
 Ile Leu Asp Tyr Leu His Lys Gln Gly Trp Ala Thr Arg
 230 235 240

aaccgccacg tcgatgtatg atacgcgggc ttttgaccag gtctgacaga gaggtgcagg 3950
 gtgaaaattg ccatattgtc ccgggatgga acgctctatt cgtgtaagcg gctgcgtgaa 4010
 gccgctatac agcgcggtca cctgggtgaa attcttgatc cgctttcttg ctacatgaac 4070
 ataaatcctg cggcgtcttc tattcactac aaaggccgca agttaccca ttttgacgca 4130
 gtgatcccg gcggttgac ccgcattacc ttttatggga cggcggcact gcgccagttc 4190
 gagatgctgg ggagctatcc gctcaatgag tcggctcgcca ttgcccgggc gcgtgacaaa 4250
 ttgcgttcca tgcaactgct ggcgcgtcag ggcacgcacc tgcctgtcac gggcattgcg 4310
 cattcgccgg atgataccag cgatttaatc gacatggctg gtggtgcgcc gctggtggtc 4370
 aagttggttg aaggcacgca gggaattggc gtcgtgctgg cggagacgcg tcaggcggcg 4430
 gaaagcgtga ttgacgcttt ccgcggtctg aacgcgcata ttctggtgca ggaatatatc 4490
 aaagaggcgc aagggtgcga tatccgctgt ctggttggtg gcgatgaagt ggtcgtgctgcg 4550
 attgaacggc gggcgaaaga gggcgatattt cgttccaatt tgcacgtgg cggcgcggca 4610

agcgtcgcca gtatcacacc acaggagcgt gaaatcgca taaaagccgc gcgaacgatg 4670
 gcgctggacg ttgctggtgt ggatattctg cgtgctaato gcgggccgtt ggtgatggag 4730
 gtgaatgcgt cgcgggggct ggaaggaata gaaaaaacca ccggtatcga catcgcggtt 4790
 aaaatgatcc gctggatcga acgccacgt acgacagaat attgcctgaa aacgggtggt 4850
 tagtcgcaat cacattactg atcatggttt tgctgcgct ttttgcgtaa gctgtgccg 4910
 tctttttatc gaaagagggt gtacaaaatt atgacatcgc tggctgttcc tggcttgat 4970
 acgctgcgtc aatggctcga tgacctggg atgagttttt ttgaatgtga taactgtcag 5030
 gctctgcac tgcccatat gcagaatttc gacgggtgtt ttgatgcaa aatcgatctg 5090
 atcgataaca cgatcctgtt ttctgccatg gcggaagtcc gaccttcagc cgtattgccg 5150
 ctggcgccg atttatctgc catcaatgcc agttcgctga ccgtgaaagc atttcttgat 5210
 atgcaggatg ataactctgc aaagctggtg gtttgccagt ctttatcgt tatgcagggc 5270
 gtaacctatg agcagtttgc atggttcgtg cgtcagagcg aagagcagat ttgatggtc 5330
 attcttgaag ctaatgccca tcaactgctg ttaccgactg atgatgaagg gcaaaacaac 5390
 gttaccgaaa actatttctt ccaactgataa ctcttttcga gcacgcagtc gctggtgcag 5450
 tggtgcgcg ctgcaaaatt atctgctgtt tttaaccttt tcttaaagat tatttcactt 5510
 ctcttggtgc gatttggtt tatcacatag agcaaatac cataaaaaatt tgttaaatac 5570
 cgttttttaa tccgagctat agtctcaaac cctggctaaa gttattcttg cgatgctttt 5630
 atatagcgag cagtgtggc cgggagaaag ttctcttttc ttacaccgcg ccgataaaaa 5690
 atatgcacgt ttattgcata tctttcagtg tgacaacttt tgttcgtttg ttaacgaact 5750
 ttcagaagga aagagatatg accgccttaa ataaaaaatg gctatcgggt ctggttgcg 5810
 gtgctctgat ggccgtctct gtcggcacgc tcgcggtga acaaaaaaca ctccacattt 5870
 ataactggtc tgattatato gcccggaca cggtgccaa ttttgaaaaa gaaaccggt 5930
 ttaaagtcgt ctacgatgtt ttcgactcta acgaagtact ggaaggcaaa ttaatggcg 5990
 ggagtaccg ctttgatctg gtggttccat ctgccagctt tctggagcgc cagttgactg 6050
 cgggagtttt ccagccgctg gacaaaagca aattgccgga gtggaagaat ctgacccg 6110
 aactgctgaa gctggtcgcc aaacacgac ccgacaataa atttgctatg ccctatatgt 6170
 gggcgacgac cgggattggc tataacgttg ataaagttaa agcgggtgctg ggcgaaaacg 6230
 cggccgtcga tagctgggac ttgatcctca aacctgaaaa tctggaaaaa ctgaaaagct 6290
 gcggtgtctc tttcctggat gcgccagaag aagtttttgc taccgtgttg aattatctcg 6350

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

gcaaagatcc caacagcact aaagcggatg attacaccgg accggcaaca gatctgctgt 6410
taaagctgcg cccgaacatt cgttatttcc attcatctca atacattaac gacctggcaa 6470
acggcgatat ttgcgtcgct atcggctggg caggtgatgt ctggcaggcg tcaaaccgcg 6530
cgaaggaagc gaagaatggc gtgaatgtct cgttctcgat tccaaaagaa ggggcgatgg 6590
cgttctttga tgtattcgcc atgcctgcgg atgccaaaaa caaagacgaa gcctatcagt 6650
tcctgaatta cctgctgcgc ccggatgtag tagcgcatat ttccgaccat gtgttctatg 6710
ccaacgcaa taaagcagcc acgcgcgtgg tgagtgcga agtccgtgag aaccaggtta 6770
tttatccgcc tgcggatggt cgtgcgaagc tgttactct gaaagtgcag gatccgaaaa 6830
tcgaccgtgt gcgcaccgc gctggacca aagtgaagag cggaaaataa tccgcagtcg 6890
tagatgccgg aggggcgcac cacaccgcc ggcaattcgc accattatgg tgcgcttgca 6950
cacattcaat gccggagagc agcgtgaat gacgctatcc ctgcgccga ggcgaaaacc 7010
cgtaaggcgc tgacgcgcgt attagaaatc cgcaacctga ccaaatacta cgatggtcaa 7070
catgcggtgg atgatgtcag cctgaccatc taaaagggtg aaatcttcgc gctgctgggc 7130
gcatccggct gtggcaagtc cacgctgctg cgtatgctgg caggtttcga acaaccttct 7190
gccggacaga taatgcttga tggcgctgat ttgtcacagg ttccgcctta cctgcgcccc 7250
atcaatatga tgtttcagtc ttacgcgctg tttccgcata tgaccgtgga acagaacatc 7310
gcttttggcc tgaaacagga caaactaccg aaagcggaaa ttgccagccg ggtcaatgag 7370
atgctcggcc tgggtcatat gcaggagttc gccaaacgca aaccgcatca gctttccggc 7430
ggtcagcgac aacgtgtggc cctggcccga agccttgca agcgcgcgaa actattactg 7490
ctcgatgagc cgatgggcgc gctggataaa aagctgcgtg acaggatgca gottgaagtg 7550
tgggatattc tggagcgcgt cgggtgtgact tgtgtgatgg tcaccacga tcaggaagag 7610
gcgatgacca tggcggggcg catcgccatt atgaatcgtg ggaaatttgt ccagattggc 7670
gaaccggaag agatctacga gcatccgact acccgctata gcgcggaatt tattggctcg 7730
gtaaactgtc ttgaaggcgt actcaaagag cgtcaggaag atggcctggc gcttgattcg 7790
ccggggctgg tgcattccact gaaagtcgac gcggatgcct cgggtggtcga taacgtgccg 7850
gtacatgtgg cgtgcgccc ggaaaaatc atgctttgcg aagagccgcc cgccaatggt 7910
tgtaacttcg cgttggggga ggtgatacac attgcctatc tcggcgatct ttcggtgtat 7970
cacgttcgtc tgaaaagtgg gcagatgatt agcgcgcagc taaaaacgc ccatcgtcac 8030

ggatgggggt gaatccggaa atcaacgccc tggcaacatt gatcctcggc gcggtcggaa 9830
 ttgtcggatt tatcgccctg tatctgatgg ctgcgcgaga aaaacagcgg atacgcgaca 9890
 tccagcgtgc aagacgtggc tgaagacact aaaatttgcc aacctggcta cataatgccg 9950
 cgcattgtgc ggcatgttt tcatggaaga cgaaacgttg ggatttttta agaaaacatc 10010
 ttcattcat gctgcctga atgtgcctgc gctgggtgcag gtggcggcgc tcgccattat 10070
 tatgatccgt ggccctgcag tgctgatgat tttcaatacg ctgggcgtgc gcggtattgg 10130
 cgagttcatt catgcgagcg tacaacctg gagtttaacg ctgggtcttt taagcagtct 10190
 ggtgctggtt ttcattgaga tctggtgtgc gttttcactg gtgaaagggc gtcgctgggc 10250
 gcgctggcta tatctgctga cacaatcac cgccgcaagt tacttgtggg cggcttcgct 10310
 ggggtacggg tatccggagc tgttcagcat tcccgtgaa tcaaacgtg aaatcttcca 10370
 tagcctgatg ctgcagaagc tgccgatat gctcatcctg atgctgctgt tcgttccctc 10430
 gaccagtcgg cggttcttcc agttgcaata atgtgtataa tcgtcgcccc tgatgatgtg 10490
 aaggtaaatg tatgcagtgc gcactttacg acgcgggtcg ctgtcgttcc tgtcagtggg 10550
 taatgcagcc gattccagag caactctccg ctaaaaccgc cgatcttaaa aatctgctcg 10610
 ccgactttcc ggttgaggaa tgggtgcgcgc cgggtgtcagg cccggaacaa gggtttcgta 10670
 ataaagccaa aatgggtggtg agtggttagcg ttgaaaaacc actgctcggg atgctgcata 10730
 gogatggcac accagaagac ctttgtgact gcccgcttta tcctgcctca tttgcgccc 10790
 tttttgcggc gctaaaaccg tttatcgccc gagcgggggt aacgcctac aacgtggcgc 10850
 gtaagcgtgg cgaactgaaa tacattctgc tgactgaaag ccagagtgat ggaggcatga 10910
 tgctgcgctt tgtactcgt tctgatacca agctggcgca actgcgtaag gcgctgccgt 10970
 ggttacacga acaactaccg cagctgaaag ttattaccgt caatattcag ccggtacata 11030
 tggcgattat ggaaggggag acggagatct acctgaccga acaacaggca ctggcggagc 11090
 gttttaatga cgtaccgctg tggatccgtc cgcaaagttt cttccagact aatccggcgg 11150
 tcgccagcca gttgtacgcc accgcgcgcg actgggtacg acagctgccg gttaaacata 11210
 tgtgggatct gttctgcggt gtggggggct ttggtttaca ctgcgcgacg cctgacatgc 11270
 agttaaccgg gatcgaaatt gcatcagagg ccattgcctg tgcaaagcag tcagccgctg 11330
 aactgggctt aacgcgtttg caatttcagg cgctggactc cactcagttt gccaccgctc 11390
 agggggatgt gccggagctg gtgctggtta acccgccgcg ccgcggcatt ggtaaaccgc 11450

11450
 11390
 11330
 11270
 11210
 11150
 11090
 11030
 10970
 10910
 10850
 10790
 10730
 10670
 10610
 10550
 10490
 10430
 10370
 10310
 10250
 10190
 10130
 10070
 10010
 9950
 9890
 9830

tgtgtgatta tctotcaacg atggcacgcg gttttatcat ctactccagc tgtaacgccc 11510
 aaactatggc gaaagatatc cgcgaactgc ctgggtttcg tattgaacgg gtgcagcttt 11570
 tcgatatgtt cccgcatacc gcgcactatg aagtgtctgac gctgctggtg aagcaataaa 11630
 aaagccgcat gtgcggcttc agattgctga caaagtgcgc gttgtttatg ccggatgcgg 11690
 cgtaaagccc ttatccggcc tacaaaagcg tgcaaattca atacattgca tggggccatgt 11750
 aggcct 11756

<210> 98

<211> 240

<212> PRT

<213> Escherichia coli

<400> 98

Met Thr Pro Thr Ile Glu Leu Ile Cys Gly His Arg Ser Ile Arg His
 1 5 10 15

Phe Thr Asp Glu Pro Ile Ser Glu Ala Gln Arg Glu Ala Ile Ile Asn
 20 25 30

Ser Ala Arg Ala Thr Ser Ser Ser Ser Phe Leu Gln Cys Ser Ser Ile
 35 40 45

Ile Arg Ile Thr Asp Lys Ala Leu Arg Glu Glu Leu Val Thr Leu Thr
 50 55 60

Gly Gly Gln Lys His Val Ala Gln Ala Ala Glu Phe Trp Val Phe Cys
 65 70 75 80

Ala Asp Phe Asn Arg His Leu Gln Ile Cys Pro Asp Ala Gln Leu Gly
 85 90 95

Leu Ala Glu Gln Leu Leu Leu Gly Val Val Asp Thr Ala Met Met Ala
 100 105 110

Gln Asn Ala Leu Ile Ala Ala Glu Ser Leu Gly Leu Gly Gly Val Tyr
 115 120 125

Ile Gly Gly Leu Arg Asn Asn Ile Glu Ala Val Thr Lys Leu Leu Lys
 130 135 140

Leu Pro Gln His Val Leu Pro Leu Phe Gly Leu Cys Leu Gly Trp Pro
 145 150 155 160

Ala Asp Asn Pro Asp Leu Lys Pro Arg Leu Pro Ala Ser Ile Leu Val
 165 170 175

His Glu Asn Ser Tyr Gln Pro Leu Asp Lys Gly Ala Leu Ala Gln Tyr
 180 185 190

Asp Glu Gln Leu Ala Glu Tyr Tyr Leu Thr Arg Gly Ser Asn Asn Arg
 195 200 205

11510 11570 11630 11690 11750 11756
 aaactatggc gaaagatatc cgcgaactgc ctgggtttcg tattgaacgg gtgcagcttt
 tcgatatgtt cccgcatacc gcgcactatg aagtgtctgac gctgctggtg aagcaataaa
 aaagccgcat gtgcggcttc agattgctga caaagtgcgc gttgtttatg ccggatgcgg
 cgtaaagccc ttatccggcc tacaaaagcg tgcaaattca atacattgca tggggccatgt
 aggcct

Arg Asp Thr Trp Ser Asp His Ile Arg Arg Thr Ile Ile Lys Glu Ser
 210 215 220

Arg Pro Phe Ile Leu Asp Tyr Leu His Lys Gln Gly Trp Ala Thr Arg
 225 230 235 240

Arg Asp Thr Trp Ser Asp His Ile Arg Arg Thr Ile Ile Lys Glu Ser
 210 215 220
 Arg Pro Phe Ile Leu Asp Tyr Leu His Lys Gln Gly Trp Ala Thr Arg
 225 230 235 240